the OIL AND GAS JOURNAL

DECEMBER 29, 1958

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Field Man's Favorite

Rockwell "1600" aluminum gas meter and Rockwell "173" service regulator measuring gas engine consumption in Texas.

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The OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
Dec. 29, 1958

Odds for keeping the voluntary import program are rising:

That's the feeling in Washington after 2-month extension of present controls. Quotas scheduled to expire December 31 will remain in effect through February 28 under interim program approved by Eisenhower last week.

Cabinet committee will continue work on proposed new program to be submitted to the President.

Quotas by country of origin are expected to be discussed this week at Washington meeting of representatives of Canada, Venezuela, and U. S.

Straw in the wind: Venezuelan Foreign Minister Rene de Sola indicates willingness to go along with quota system rather than risk international price war.

Unfavorable reaction to cabinet committee failure to come up with a new program comes from critics of present controls.

Sen. O'Mahoney says Congress will have to make the decision on import restrictions.

Russell B. Brown, IPAA spokesman, says it's discouraging that uncertainty and confusion will be allowed to continue 2 more months.

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Eisenhower faces a fight on higher gasoline taxes.

New Congress may get its back up at his plan to increase federal tax. President mentioned no definite figure in revealing his plans. Associates say increase will be 1½ cents a gallon, making the levy 4½ cents.

Congressmen have been receiving stacks of mail from oil and trucker interests, as well as private motorists, oppcsing any increase.

Gasoline taxes are already so high that any increase will stiffen sales resistance. That would hurt the entire oil industry which only recently has been encouraged by a pickup in sales for its chief money product.

Job of the industry: Encourage the motoring public to let Congress know how it feels about higher fuel taxes.

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Taxes actually may be the industry's big headache during

first half of 1959.

Witness the 10% increase in Venezuela's income tax on oil companies. This was imposed by the junta but is mild compared to a tax program reportedly being cooked up by politicians.

In the U. S., state legislatures begin convening early in January. Taxes and tighter conservation laws appear the major issues before them affecting oil (p. 69).

Talk in western oil states mentions possibility of higher income taxes, new gross production or severance taxes, higher lease rentals, or tougher ad valorem taxes.

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Sound approach on higher state gasoline taxes is being taken by New York State Petroleum Council.

It will strongly oppose any increase in state gasoline tax until all highway-user tax revenue is legally earmarked for highway purposes.

In 1959, more than $23.7 million in New York motorists' tax was used for nonhighway purposes. This is a familiar story also in other states.

The council summed up its position this way: The time has come to put a halt to the practice of hitting the motorist whenever new tax revenue is needed...The motorist is carrying more than his fair share of the tax burden to provide and maintain highways.

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Big question for '59: How much will the oil industry spend on new plant, equipment, and supplies?

Refiners and processors, according to federal estimates, will lay out about 2.2 billion dollars in new plant and equipment during year's first quarter. It's slightly less than the outlay in last quarter of 1958.

Outlook is better for oil-country steel goods. With drilling expected to pick up and production to grow to meet expanding demand, there will be a better market for steel items.

Tubular-goods orders picked up in the last quarter (p. 74). Oil companies reportedly have depleted their inventories on commonly-used sizes and bought to meet current needs. Threat of a strike in steel at midyear may influence some oil men to reexamine their low-inventory policy.

Steel mills report a quickening pace of orders from all industry has been felt in the last few months. Delivery schedules have started to stretch out on some categories. Steel officials expect the industry to operate at 80% of capacity by midyear.

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Other major buyers have joined in cutting crude prices in Kansas. Like Oklahoma, Kansas is emerging with a double price

standard with tops at $3.05 and $3.08 a barrel.

Mobil Crude Purchasing, state's largest buyer, posted a 10-cent cut to $3.05 on 55,000 bbl. daily. Indiana Oil Purchasing cut only 7 cents to a $3.08 top.

In other price actions, American Petrofina reduced its prices by 5 to 15 cents a barrel in 11 fields in East Texas. South Penn Oil Co. increased its price by 15 cents a barrel on Pennsylvania-grade crude. Split price looms, however, when Quaker State declined for time being to go along with rise.

Prices of heating oils are up quarter of a cent due to a strong December demand.

Gulf and East Coast suppliers raised their prices first. Mid-Continent suppliers followed suit last week. They reported extremely heavy demand at Kansas City, Des Moines, Minneapolis, and Chicago.

Secondary-recovery projects for Aneth area can be expected to shape up soon.

Utah conservation officials have told operators to be prepared within about 3 months to show cause why secondary-recovery programs should not be started.

Commission also has ordered monthly reports on Aneth area gas-oil ratio for each well, gas and oil production by leases, and bottomhole pressure.

Commission plans to shut in any lease which produces too much gas for three consecutive months.

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Oregon wildcat is plugged back to test an upper zone.

Well is 1 Barr in Linn County. It had oil and gas shows in samples during drilling, and liner was set at 4,420 ft. with total depth of 4,543 ft.

Operator, Linn County Oil Development, tested 4,300-18 ft. interval. Recovery was 265 ft. of slightly oil-cut mud and 355 ft. of muddy water. Well then was plugged back to 2,300 ft. to test gas interval.

Well is closely watched because only previous drilling was 25 miles away. It is in Lebanon area 40 miles northeast of Eugene.

Shallower zones are being tested by California Standard at its 2 Swanson River Unit on Alaska's Kenai Peninsula.

On test of interval at 11,038-60 ft. oil flowed at rate of 15 to 20 bbl. an hour. Testing of interval 10,800-875 ft. is now in progress.

Wildcat is 2 miles south of Swanson River Unit discovery which flowed at rate of 900 bbl. daily.

Lorac is going to work for the missile program.

Seismograph Service Corp. is completing arrangements to

install a four-station Lorac network at Cape Canaveral for use in positioning missile-launching ships.

Lorac equipment was developed for exploration in the offshore petroleum industry.

World's largest mobile offshore platform has arrived in Santa Monica Bay. Its legs are 275 ft. long.

First job, however, will be laying a 12-ft. diameter offshore sewer line. Then it will be converted for oil drilling (p. 71).

Alaska's Copper River basin is scheduled to get its first integrated geophysical and geological survey.

A 14-member crew of Research Exploration, Inc., Houston, has already left for Alaska. It is working for a major with interests in the new state.

Purpose of the survey is to determine depth to basement and not pin down any particular structure. Certain areas will be detailed later.

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Production this year at natural-gasoline and cycling plants will be off about 1.5% compared with 1957.

This is first decrease in plant production since 1933.

Polyethylene-film production is expected to top 279 million pounds in 1959 with value of $315 million, up $20 million from 1958 values.

Market estimate was made by Visking Co., plastics division of Union Carbide.

Weather outlook until mid-January is encouraging for oil marketers.

Forecast calls for colder than normal temperatures over the eastern half of the nation with only light to moderate precipitation.

If this proves true, it's made to order for good heating oil sales and should keep gasoline sales firm also.

▼ ▼ ▼

Package plan to move 100 million cubic feet daily of gas from offshore Louisiana to eastern states is before FPC.

Project means $40 million in new pipeline construction.

Hope Natural proposes to use its own offshore production plus purchases from others to supply affiliated distributing outlets in Ohio, West Virginia, and Pennsylvania.

Texas Gas Transmission will gather and move the gas to a point near Lebanon, Ohio. There Texas Eastern Transmission will pick up the load and move it to lines of Hope Natural and its affiliates (p. 82).

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Good Wells Make Good News

A Monthly Report On Wells That Are Now Worth More

December 29, 1958

Chances for increasing your net income or making your wells worth more can often be enhanced by a Dowell acidizing treatment. Here are four recent Dowell acid treatments that helped producers increase income:

- **San Juan County, Utah** (New Oil Well) This well was completed through perforations from 5370 to 5490 feet into the Aneth lime. Before treatment, well swabbed 10 boph. Dowell washed perforations with Mud Acid and then acidized in five stages using Fixafrac® (temporary plugging service) between stages. 6500 gallons Dowell acid with emulsion-preventing and surface tension reducing agents were used. After clean-up, well tested 1050 bopd with 2000 psi surface pressure.

- **Garvin County, Oklahoma** (New Oil Well) This well was completed in the Hunton lime of the North Lindsay pool. Perforations were from 10,198 to 10,240 feet. Dowell acidized with 10,000 gallons Retarded Acid. Injection was down tubing at 6 bpm and 4000 psi. Before treatment, well swabbed 20 bopd. After clean-up, it flowed 118 bopd.

- **Barton County, Kansas** (Old Oil Well) This well was initially completed open hole in the Arbuckle dolomite from 3332 to 3339 feet. Initial production was 66 bopd after a 500-gallon acid treatment. After five years, production had declined to 8 bopd and 12 bwpd. A 200-gallon regular acid job was unsuccessful. Dowell engineers recommended treating with 1250 gallons regular acid followed by 100 pounds of magnesium pellets and 1000 gallons Stabilized Acid. This treatment had a three-fold purpose. It was designed to speed reaction with the dolomite, and melt hard hydrocarbons with heat; the stabilizing agent was added to keep dissolved iron salts from re-precipitating and plugging the formation. After settling down, well pumped 54 bopd and 240 bwpd. Treatment costs paid out in less than 20 days.

- **Southwestern Alberta, Canada** (New Gas Well) Pay was a 900-foot section of the Mississippian dolomitic lime at about 12,000 feet. Initial production was low, but thick pay made extensive treatment advisable. Operator decided on series of acid jobs, cleaning out and running back-pressure tests after each treatment to evaluate "skin effect." The object was to minimize pressure loss near bore hole so maximum potential might be reached. Dowell performed five treatments, using 60,000 gallons acid with surface tension and demulsifying agents, plus 20,000 gallons Retarded Acid. Calculated open flow was over 65 million cubic feet per day after treatments.

When you specify Dowell for acidizing, you get the benefit of more experience than you can get from any other service company. For prompt service, call any of the 165 Dowell service points and offices. In Canada, contact Dowell of Canada, Ltd.; in Venezuela, United Oilwell Service. Or write Dowell, Tulsa 1, Oklahoma.

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World-Wide Oil Report

Summary of Journal's World Survey 87

A recapitulation of figures for reserves, producing and drilling wells, production, and refining capacities for the world's oil countries. A handy index helps to find the individual reports.

Detailed Figures on Latin America 89

The oil industry south of the border is in an eventful period. Operators in Venezuela are keeping their fingers crossed that relations with the new government will run smoothly. Newcomers to Lake Maracaibo continue to have exploration success, and exports of the newly found oil are growing. Argentina is moving boldly to solve its oil shortage with development contracts with foreign companies that so far total hundreds of millions of dollars. Brazil's government-run program is raising output in established fields, while looking for a big strike elsewhere that could put the country's industry on its feet. Exploration is lively in Bolivia and Colombia, and drilling has been started in Paraguay.

Detailed Figures on Europe 106

Refinery construction is booming in this part of the world. New West German plants are being built in the Rhine-Ruhr marketing area to take advantage of a new crude-oil-pipeline system that has started moving oil southward from Wilhelmshaven. A second major line is under construction to interior West Germany from Rotterdam. In France, refiners are getting ready for large scale crude supplies, with emphasis on plants in the interior. These will be fed by a pipeline running northward from Marseille. In United Kingdom, projects at the deep-water port of Milford Haven will take advantage of giant, deep-draft tankers.

Detailed Figures on the Middle East 117

This region continues to add to its reputation as the free world's oil tank. Kuwait's offtake potential will be boosted by 1 million barrels daily next year when a new tanker terminal opens. In Saudi Arabia, two wells which made field discoveries last year have been completed as producers. Iraq's production from southern fields is scheduled to increase when a new terminal at the head of the Persian Gulf is completed. In Iran, a new terminal and pipeline from Gach Saran field are under construction.

Detailed Figures on the Far East 124

Indonesia's crude-producing capacity has taken a big jump forward with the opening of a new terminal at Dumai, Sumatra, which is fed by a 30-in. line from Duri field. A discovery in Papua, Australian New Guinea, has raised hopes even though the find itself is running to water. Another company has joined the three-company group looking for oil in Western Australia, and an American independent has teamed up with a local company for a deep test next year in the Great Artesian basin. Both concessions are larger than Texas. Wildcatting has started in Burma for the first time since World War II. Private companies are pushing exploration in Pakistan. In India, private work has been augmented by a Soviet-aided government exploration program.

Detailed Figures on Africa 131

Africa is the hottest exploration area in the world today. Old French dreams of oil from the Sahara are coming true. Major discoveries at Hassi Messaoud and in the Edjele area will make Algeria a major oil country when pipeline projects now being started to the Mediterranean are completed. Oil men in Libya have been teased by promising discoveries. Geologists working in the coastal basins of West Africa are learning more daily. Small-scale production has started in three areas along the Atlantic Coast within 2 years. Five discoveries have been made in Nigeria this year alone. East Africa is still dry. But basins along the shores of the Indian Ocean and the Gulf of Aden are being probed by several companies.

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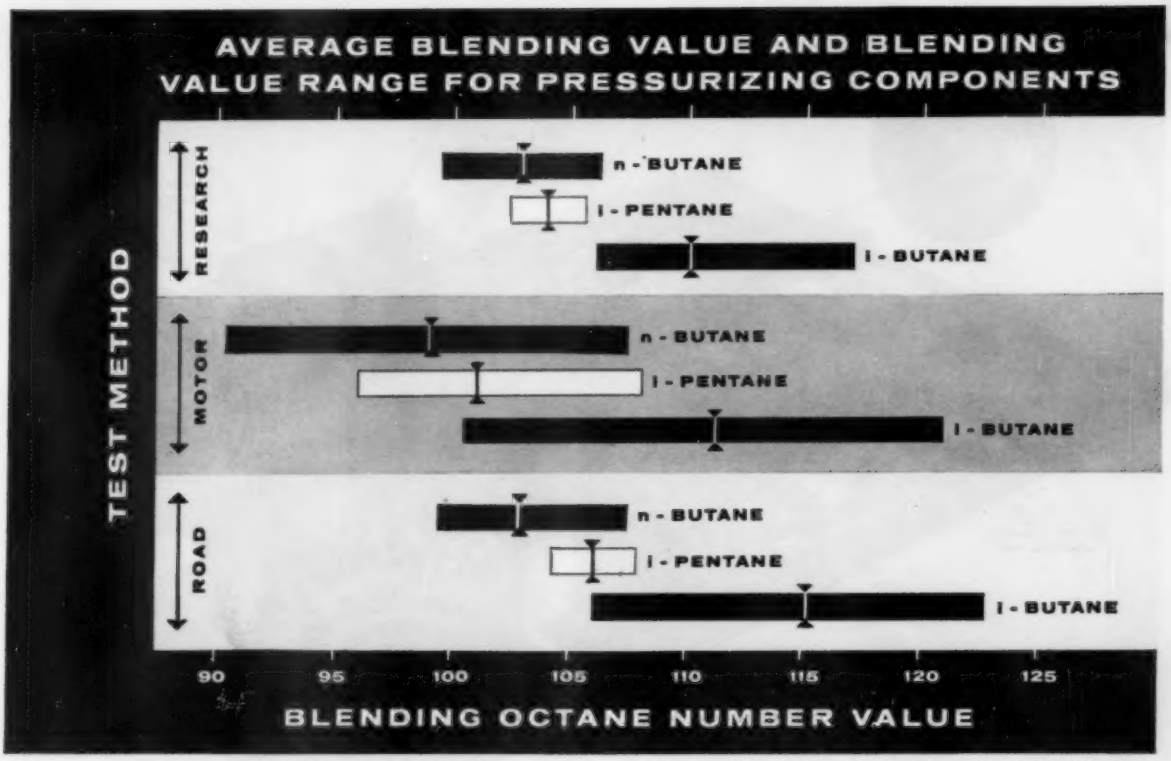

Average blending values are shown by the arrows. The length of the bar indicates the range of the blending values in the different base fuels.

Blending values of pressurizing agents in tomorrow's gasolines and engines

BY J. J. GREYTAK

The Du Pont Petroleum Laboratory has recently completed a significant road and laboratory study of the blending value of pressurizing agents. The results are particularly important because they were obtained with high octane stocks in high compression ratio cars.

The vapor pressure control materials studied in the tests were n-Butane, iso-Butane, and iso-Pentane.

Several typical fuels were made up from combinations of light and full-range cat-cracked stocks; C_5 and C_7 plus reformates; a thermally cracked reformate; an aromatic extract and an aviation quality alkylate.

The blends were treated with the three pressurizing agents and rated both in the laboratory and on the road. Road ratings were conducted in three 12:1 compression ratio cars. All finished blends contained 3 cc. of tetraethyl lead per gallon.

This table shows the average octane blending values of the three pressurizing agents:

OCTANE NUMBER	AVERAGE BLENDING VALUES		
	n-Butane	iso-Pentane	iso-Butane
Research ...	103	104	110
Motor	99	102	111
Road	103	106	115

Although i-Butane is shown to have the highest octane blending value of the three pressurizing agents, the amount that can be used in a commercial gasoline is limited by its high vapor pressure. Consideration of both volatility and octane blending values for the three vapor pressure control materials, leads to the conclusion that more gasolines of higher octane number can be made using i-Pentane than by using either of the butanes.

The exact quantities of iso-Pentane which should be employed will be determined by the amounts available as well as by the over-all refinery processing schemes.

In addition to the above, the investigations provided information on the influence of the base fuel compositions. For example, it was found that the Motor Method blending values of n-Butane and iso-Pentane were highest in fuels containing alkylate.

Further detailed information regarding this program is available upon request. E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Delaware.

JOHN J. GREYTAK is an engineer in the road antiknock group at the Du Pont Petroleum Laboratory. He is co-author of the paper "Road Octane Numbers of Tomorrow's Gasolines in Tomorrow's Cars" which he presented at the API Refinery Meeting in May 1957.

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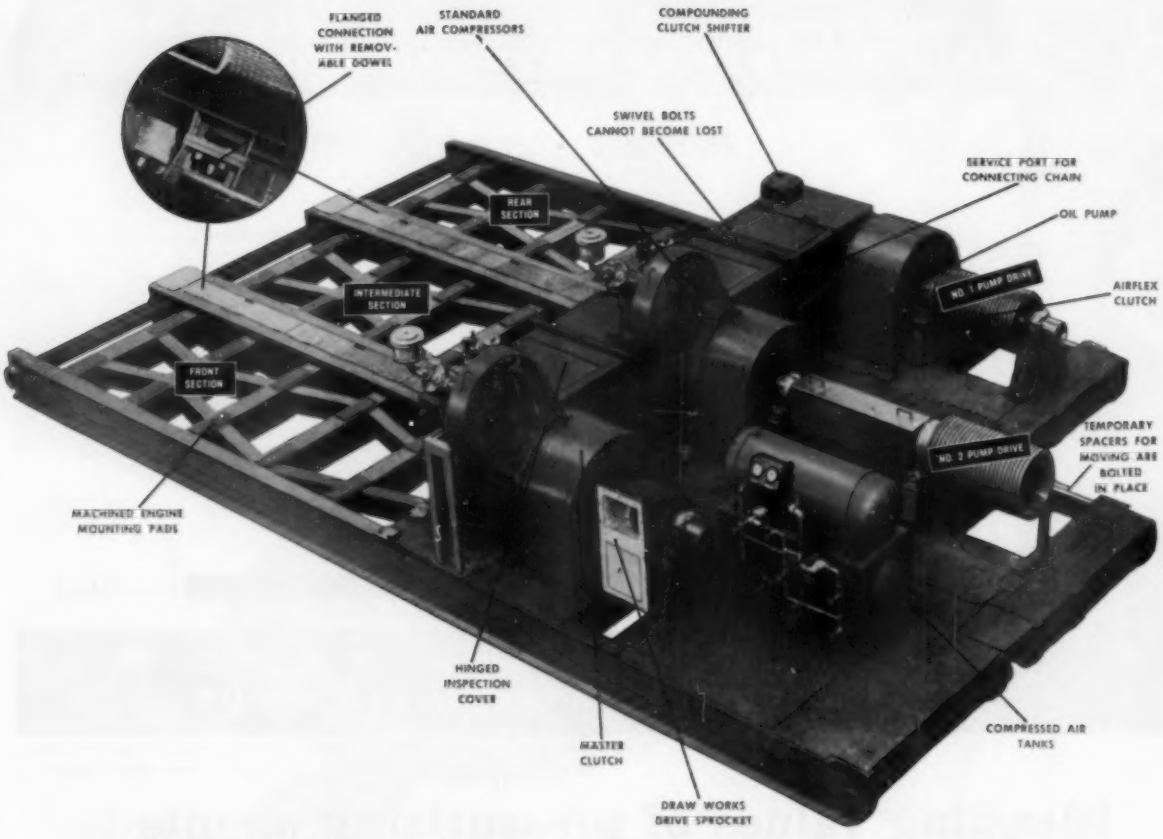

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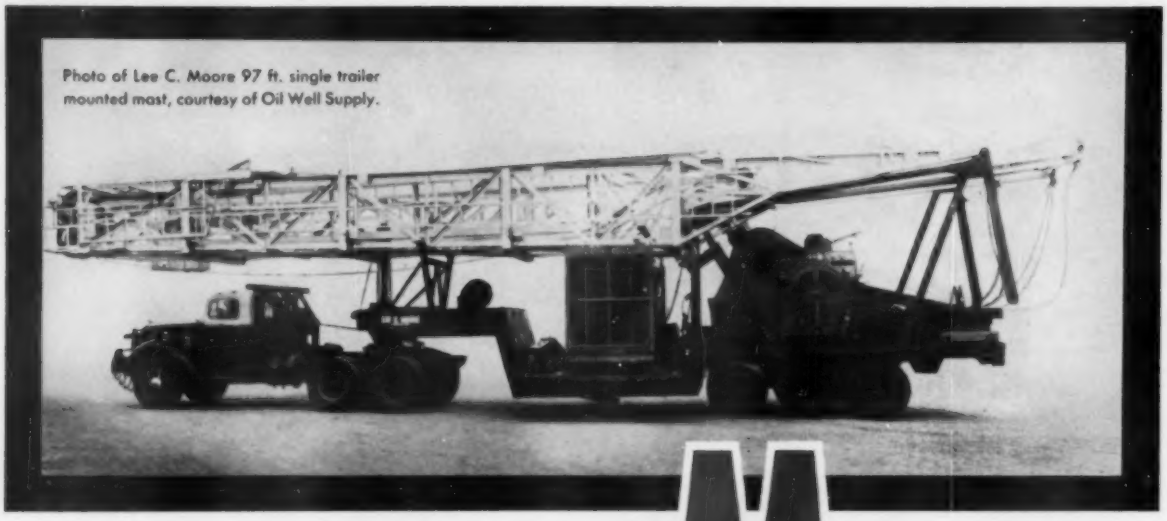

Photo of Lee C. Moore 97 ft. single trailer mounted mast, courtesy of Oil Well Supply.

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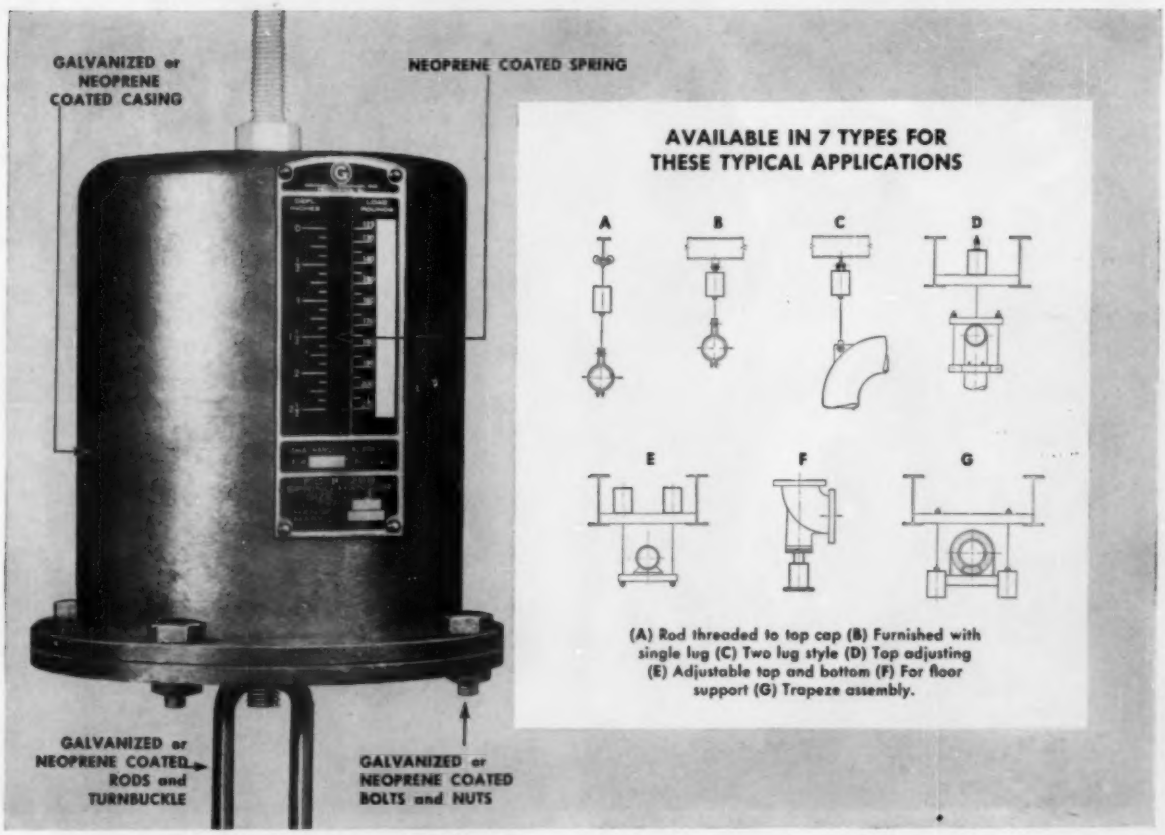
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F
G
(A) Rod threaded to top cap (B) Furnished with single lug (C) Two lug style (D) Top adjusting (E) Adjustable top and bottom (F) For floor support (G) Trapeze assembly.

In addition to their proven corrosion and weather resistance, these spring hangers offer other features.

- Maximum variation in supporting force for standard spring models per ½" of deflection is 10½% of rated capacity — in all sizes.
- Precompression (a patented feature) assures operation of spring within its proper working range, as well as saving valuable erection time. Reduced over-all height saves space.
- 21 sizes available from stock for load ranges from 50 lbs. to 28,200 lbs.
- Available in 3 spring lengths for maximum travel of 1¼, 2½, and 5 inches.
- Installation simplified by integral load scale and travel indicators.
- All-steel welded construction meets pressure piping code.

For hanger installations which are subject to highly corrosive industrial conditions — or where exposed to severe weather, Grinnell makes available two distinct lines of pre-engineered spring hangers.

These hangers are the result of extensive experimentation with various coatings for Grinnell's standard pre-engineered spring hangers. In addition to providing flexibility in pipe suspension, they provide versatility of application through their corrosion-resistant characteristics.

1. NEOPRENE COATED – for highly corrosive conditions, such as those found in chemical plants and refineries. All parts of the hanger are neoprene coated to protect the base metal from a wide range of corrosives. The flex life of the spring is unaffected by the neoprene . . . the coating resists cracking or flaking over a wide temperature range.

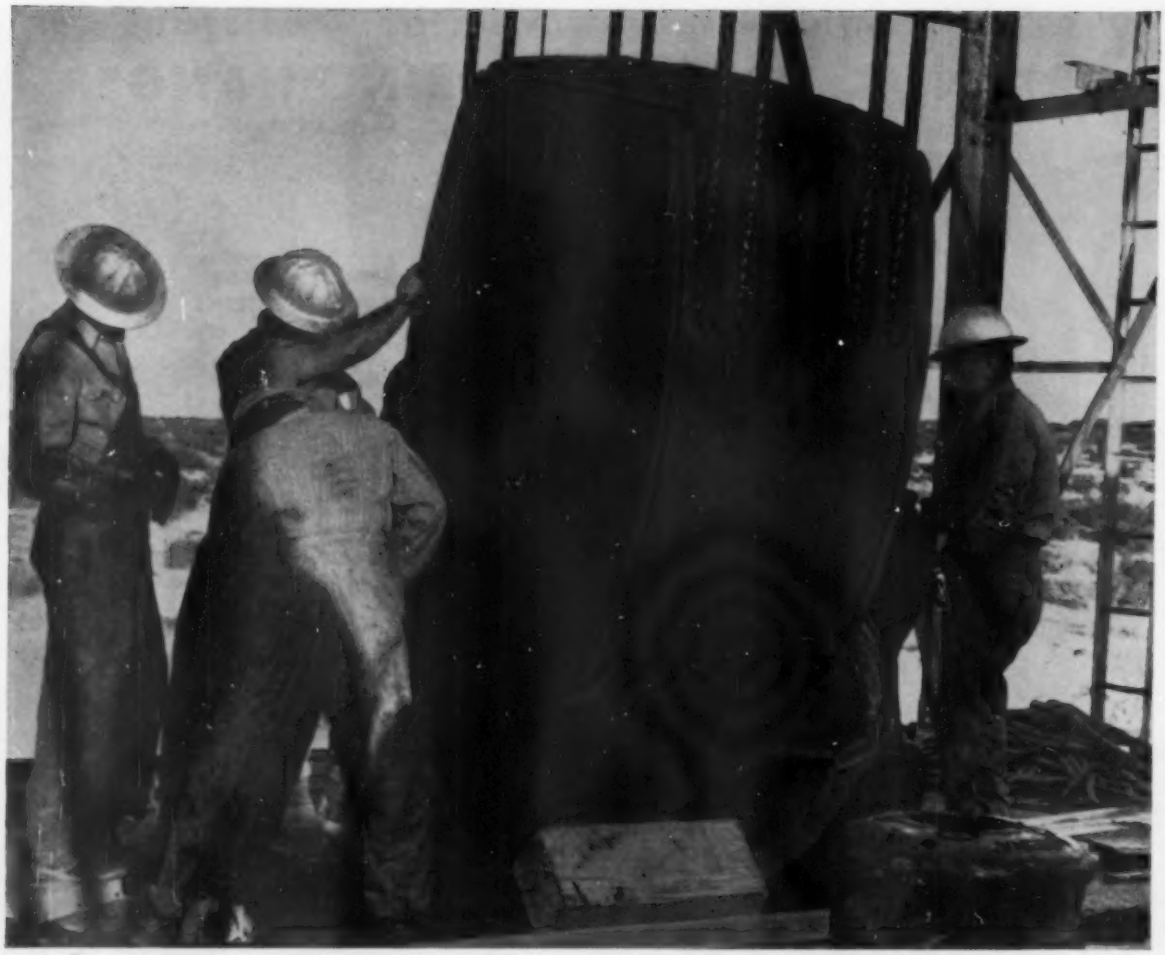
2. GALVANIZED – for outdoor installations, where weather conditions are severe. All parts of the hanger are galvanized except the spring, which is neoprene coated to avoid alterations of temper, hydrogen embrittlement and decreased flex-life of the spring – usual hazards to springs from the galvanizing process. Write for further details.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems



RIG UP WITH Regan!

Oil men everywhere rig up with Regan traveling blocks for faster, more economical drilling. The Regan Type-M traveling block, shown above on Great Western Drilling Company's Rig 44, was recently used in drilling a 23,400' West Texas test. This 500-ton capacity heavyweight falls fast and speeds the running of drill pipe into the hole. Regan blocks require a minimum of field maintenance . . . operate economically on any rig. Manufactured to extra precision-tolerances, these blocks are designed to allow complete interchangeability of parts. Because of their low center of gravity, Regan blocks travel straight in the derrick. For complete information on all Regan blocks, call your nearest Mid-Continent Supply Co. representative.

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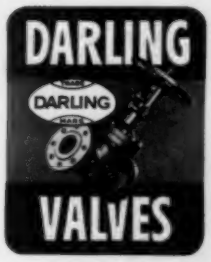
ALUMINUM GATE VALVES

by Darling

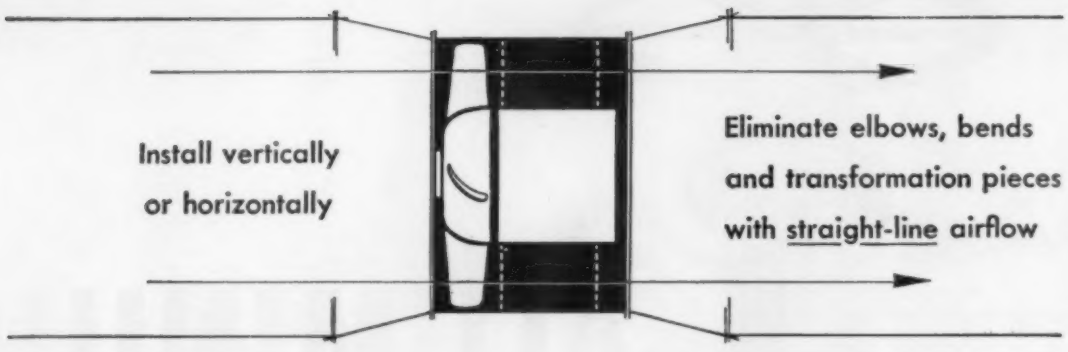
Darling gate valves of aluminum alloy offer all of the unique, extended-life features inherent with the Darling fully revolving double disc, parallel seat principle... for performance that assures unmatched economy... and freedom from leakage, trouble and downtime!

These Darling aluminum alloy valves are now available in ½" through 24" sizes. Write for full details, specifying your particular service requirements.

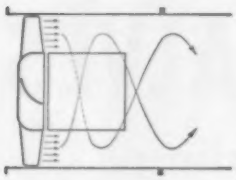


DARLING VALVE & MANUFACTURING CO.

WILLIAMSPORT 1, PA.

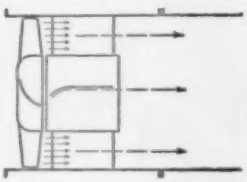


Large-diameter hub and die-formed blades insure uniform air velocity from hub to tip.



TUBEAXIAL

Air discharge follows a spiral path, then straightens out a short distance from fan at moderate pressures.



VANEAXIAL

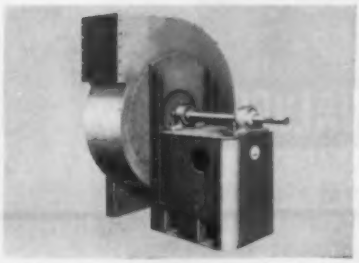
Air discharge is transformed into useful energy by directional guide vanes, increasing efficiency, pressure.

American Blower axial fans deliver the volume you need; fit the space you have!

Whatever your air-moving problem – ventilating, heating, drying or processing – you'll find an economical solution in the complete line of precision-built American Blower fans. *Plus-value:* Rugged construction of every American Blower fan gives you extra years of low-cost service with minimum maintenance.

Seventy-three American Blower branch offices from coast to coast – are staffed by skilled sales engineers. Ask them to help you select the right equipment for *your* job. Call today! American-Standard,* American Blower Division, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

It pays to standardize on American Blower fans for every duty!



Industrial Fans – 3 optional wheels handle air, material, long shavings.

HS Fans—direct or V-belt drive, medium-speed operation; nonoverloading.

Sirocco Fans – low speed, quiet operation; move more air per revolution.

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COPPER DEACTIVATOR

Even in exposed, below-freezing locations, UOP AW(50) Copper Deactivator flows readily, doing away with low-temperature pumping problems common to ordinary deactivators. And, whether you use AW(50) in the five-gallon manual-application size, or 55-gallon drums for automatic injection, it will not freeze and can be easily pumped even when stored for long periods at temperatures as low as 0°F.

In addition to superior pouring properties under low-temperature conditions AW(50) gives maximum metal deactivating efficiency and economy. It is instantly soluble in hydrocarbons, and is light in color.

UOP AW(50) is a "must" for refiners stabilizing gasoline, jet fuel, domestic heater oil and diesel fuel in all northern latitudes where temperature drops are extreme.

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LUFKIN *Initiative*

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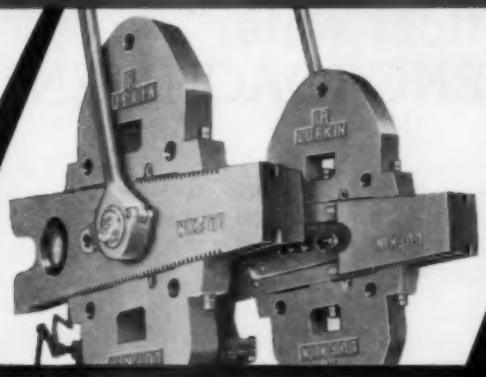
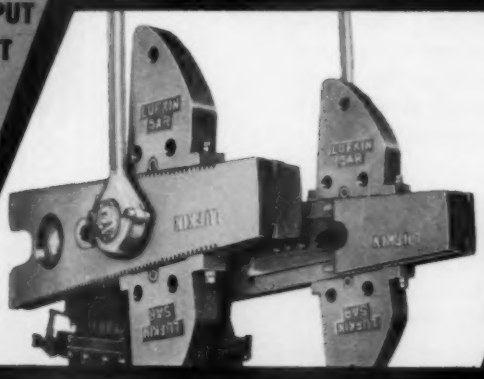
TROUT "RO" Series
COUNTERBALANCED CRANK*

IT'S WHERE YOU PUT THE WEIGHT THAT GETS RESULTS.

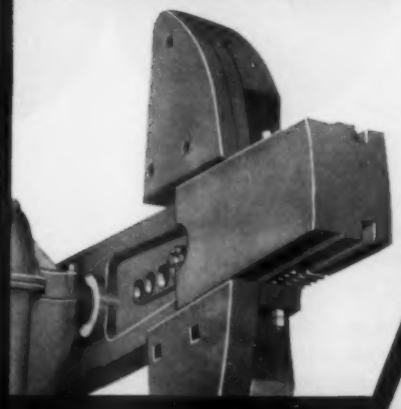


Larger counterweights for above average requirements. Increased thickness at end of crank for extra counterbalance.



Smaller counterweights are interchangeable on the same cranks for reduced counterbalance requirements.

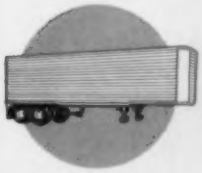
***OFFERS *MORE* EFFECTIVE COUNTERBALANCE FOR *LESS* WEIGHT**



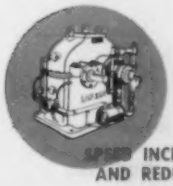
Extra space for thicker weights allows greater weight concentration at outer end of crank. Thick or thin auxiliary weights for greater counterbalance flexibility.

PUMPING UNITS

GAS ENGINES



TRAILERS



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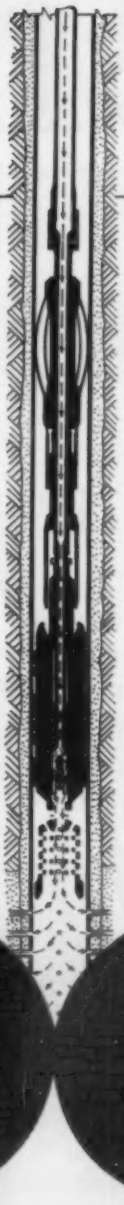
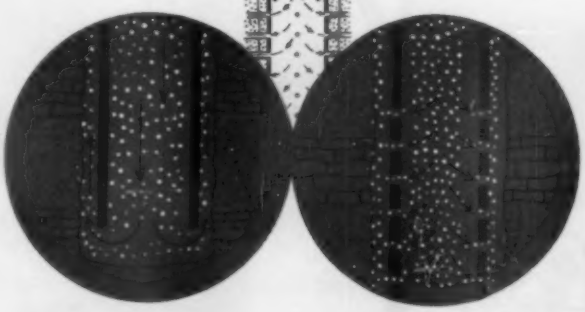
HALLIBURTON
SQUEEZE CEMENTING



HELPS STOP "bottom water" ENCROACHMENT

Hydraulic pressure "squeezes" cement slurry into the formation, around the casing seat or through perforations to help shut off bottom water without sealing off oil.

By proper selection of cements, water-cement ratios and admixes... By use of proven techniques and modern high pressure equipment... Halliburton's flexible squeeze cementing methods can be effectively used to help stop water and gas encroachment.



SQUEEZE CEMENTING AIDS IN...

- repairing casing leaks
- isolating producing zone before perforation for production
- correcting defective conditions such as channeling
- sealing off low pressure formations
- preventing migration of fluids and reduce chance of contaminating other zones or wells after abandonment of depleted producing zone

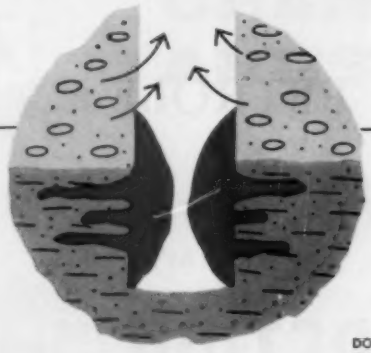
Benefit from Halliburton's broad experience ...many thousands of successful squeeze jobs ...consult Halliburton first!

HALLIBURTON

OIL WELL CEMENTING COMPANY, DUNCAN, OKLAHOMA

HERE ARE METHODS and MATERIALS THAT PROMOTE MORE EFFECTIVE SQUEEZE JOBS!

DIACEL LWL

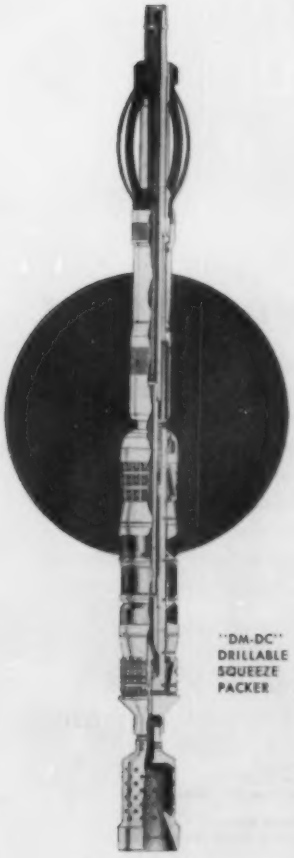


DOC
(Diesel Oil Cement)

DIACEL LWL... Where low fluid loss properties are desired, Diacel LWL blend in cements will give low filtration rates comparable to drilling muds. This low fluid loss additive can be utilized with virtually all types of cementing compositions; functions well as a retarder for deep hole cementing.

DOC (Diesel Oil Cement) uses water in the formation to produce a set cement of high density, high compressive strength and very low permeability. Widely used in squeeze cementing operations to aid in shutting off water in oil wells.

Since DOC is composed of only cement, diesel oil and Halliburton's efficient dispersant DOC-3, it will never set until contacted by water. After the initial contact with water, which thickens the slurry, the excess DOC which is not contacted by water, is reversed out with ease. This desirable feature provides effective water shut-off with relatively small volume of this low fluid loss mixture.



"DM-DC" DRILLABLE SQUEEZE PACKER

"DM-DC" DRILLABLE SQUEEZE PACKERS

... designed to provide a positive fluid shut-off from either direction ... to form an effective plug for squeezing cement or fluid below the packer at any predetermined point behind the casing or liner, or around the shoe or shoe joint.

... these dependable packers may be run on drill pipe, tubing, a drilling line or with electric wire line powder type setting tool. They offer simplified setting procedure—a positive mechanical action of rotating tubing to the right—freedom of Tubing and Circulating Valve from packer before squeezing begins and many other outstanding operational features.

... the DM or DC Squeeze Packer may serve as a casing bridge plug to prevent movement of fluid through the packer from either direction. They may be converted by dropping or pumping a Sealing Plug down to the packer after set in casing.

..."DC" Open Hole Squeeze Packer, identical to the "DC" Drillable Squeeze Packer except for addition of an extension mandrel and long rubber seal element, used extensively in open hole formations that are near to true bit size.

MUD-KIL effectively neutralizes the cement retarding properties of quebracho and other tannins, starch, sodium carboxymethyl cellulose and lignite. Pumping time and compressive strengths of cement are unaffected. This dry, granular material may be mixed in the dry cement or dispersed in the mixing water.

CEMENTING SERVICES

284 SERVICE CENTERS—JUST MINUTES AWAY FROM YOUR WELL

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SCALE DEPOSITION	S. P.* Scale Preventives
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TANK AND EQUIPMENT CLEANING	TRET-O-LITE* TC Tank Cleaners
EMULSIFICATION OF OIL IN TRANSIT	TRET-O-LITE* FEP-95 Demulsifier
COPPER CONTAMINATION IN PRODUCTS	KUPLEX* Metal Deactivator
PRODUCT DEGRADATION	TOLAD* Fuel Additive

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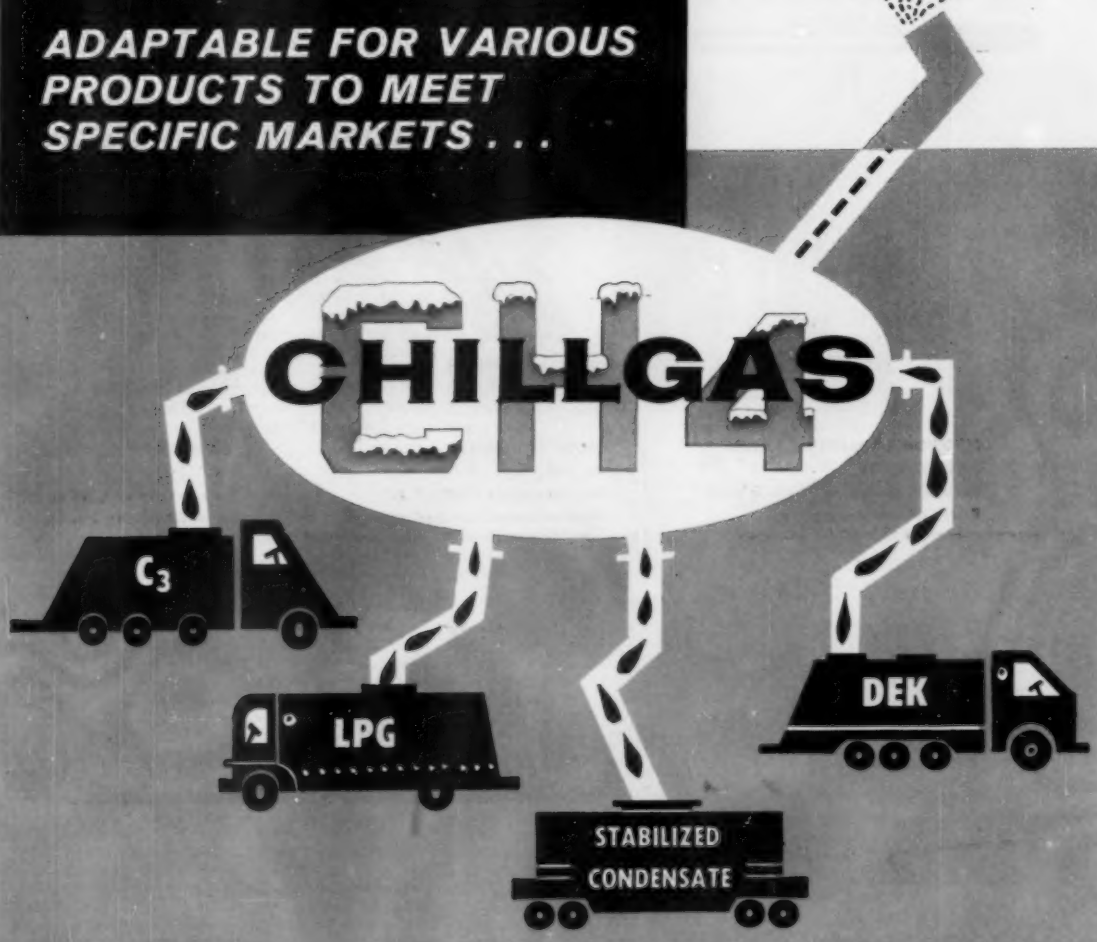

PERFORMANCE DATA:

High Liquid Recovery · Automatic Adjustment to Load Changes
Dehydrates With No Additives · Strips With No Pressure Drop

OPERATING DATA:

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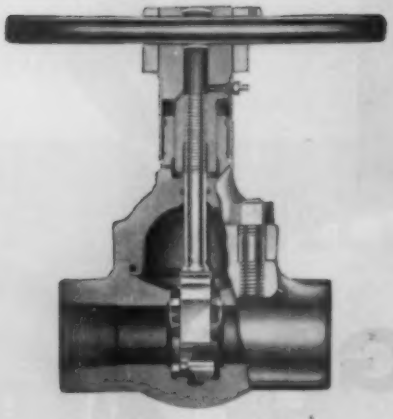
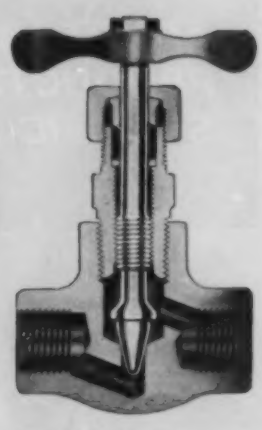
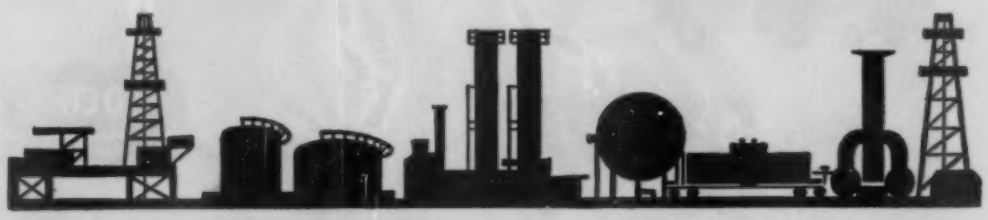


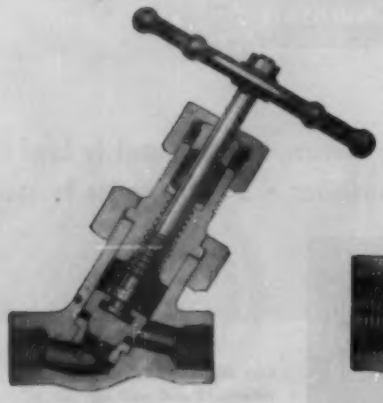
MUDWONDER MUDLINE VALVES
Figs. 2128-3128
For pressures to 2,000-3,000 lb WOG
Bolted bonnets, screwed or flanged ends

GLOBE STOP VALVE
Fig. 158
For pressures to 10,000 lb WOG
Screwed bonnet, screwed or socket welding ends

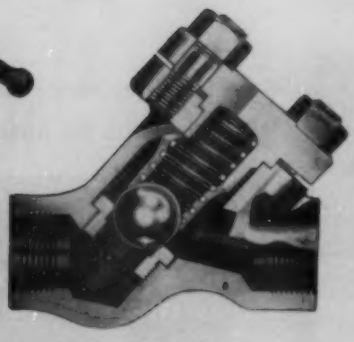


GLOBE GAGE VALVE
Fig. 152
For pressures to 4,000 lb WOG
Screwed or union bonnet, screwed ends

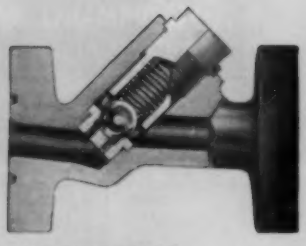




GLOBE STOP VALVE
Fig. 2698
For pressures to 2,000 lb WOG
Union bonnet, screwed or socket welding ends



BALL CHECK VALVE
Fig. 4632
For steam pressures to 600 lb A.S.A. (2,000 lb WOG)
Horizontal or vertical
Bolted cover, screwed or socket welding ends



BALL CHECK VALVES
Figs. 5160-9160
For pressures to 5,000-10,000 lb WOG
Horizontal or vertical, screwed covers, flanged ends

Valves Work Everywhere

in drilling...production...refining...

Edward valves are on the job, no matter where you look. From the towering derricks of Northern Alberta to offshore rigs on the Gulf . . . from refineries on the Jersey Flats to California natural gas plants . . . the word is—"You buy a better valve from Edward!"

Edward Globe Valves

Bodies are drop-forged steel, for greater strength and resistance to erosion. Large-diameter handwheels permit operation without a wrench or cheater; cross-arm Impactor* handle for quick, tight closing is standard on 2" Fig. 158. Figures 158 and 2698 have replaceable seats. Disks—both plug and needle types—are carefully aligned, and seats are lapped for tight sealing. Stems are EValloy,* an exclusive Edward stainless steel, centerless ground to a fine finish. Carefully machined Acme stem threads assure easy operation. Bonnet threads plated by an exclusive EValizing* process for maximum resistance to wear and corrosion. Deep stuffing boxes, with exclusive EValpak* asbestos-graphite packing, assure a tight seal with minimum resistance to stem turning.

Edward Ball Check Valves

Identical to Edward globe stop valves in body and seat features. Rolled steel bonnet with integral ribs to guide ball accurately. Ball is corrosion-resistant high carbon stainless steel, precision-ground for tight seating. High carbon stainless steel spring gives positive aid in seating ball.

Edward Mudwonder Valves

Body and bonnet are high-strength alloy steel with heavy body-bonnet cover flanges. Accurately machined to assure drop-tight sealing under extreme pressures. Double-threaded yoke bushing, completely enclosed, gives 2-to-1 ratio. Corrosion-resistant stainless steel stem with slotted gate coupling to eliminate bending or binding. Gate is hard chrome plated to reduce friction, resist erosion and abrasion. Seat insert of resilient buna-N synthetic rubber, molded integrally over steel wear rings. Seat and gate easily replaced without removing Mudwonder* from line.

WHERE CAN YOU USE EDWARD VALVES?

Our customers report complete satisfaction in the use of Edward valves for water flood service . . . throttling . . . on high-pressure heaters, treaters and separators . . . on pressure vessel controls . . . on headers and flow lines to heaters and exchangers . . . for manifold service . . . in gasoline or gas sulfur extraction plants . . . for "unloading" valves at gas compressor stations . . . and in many other applications. You name your need . . . let your Edward representative show how to fulfill it with versatile, economical, completely dependable Edward valves. They are available from your favorite oil field supply store, from your industrial distributor, or direct from *Edward Valves, Inc., 1212 W. 145th Street, East Chicago, Indiana* (Subsidiary of Rockwell Manufacturing Company). Represented in Canada by Lytle Engineering Specialties, Ltd., Montreal, and Rotary Sales & Service, Ltd., Edmonton.

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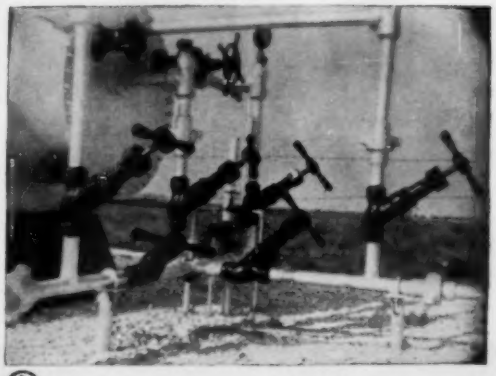
Edward builds a complete line of forged and cast steel valves from ¼" to 18"; in globe and angle stop, gate, non-return, check, blow-off, stop-check, relief, hydraulic, instrument, gage and special designs; for pressures up to 10,000 lbs; with pressure-seal, bolted, union or welded bonnets; with screwed, welding or flanged ends. *T.M. Reg. U.S. Pat. Off.



Edward 2" Fig. 158 valves in service on heater by-pass lines in Louisiana oil fields. Note Impactor handles for quick, easy closing against high pressures.

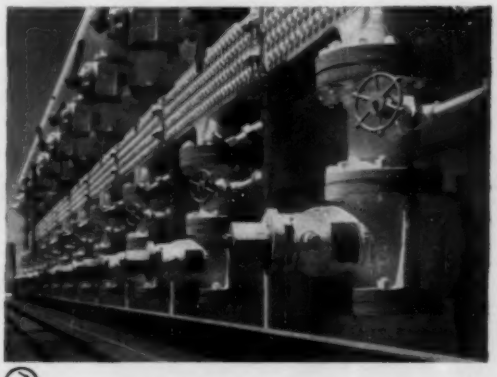


Fig. 2698 valves on cooling coils of natural gas cooler. Scene: New Mexico field processing plant. Lubricated plug valves in photo are Rockwell-Nordstrom.

Forty-two Edward forged steel globe valves (Fig. 2698) throttle the flow on this West Texas water flood. Owner reports absolutely no maintenance costs in two years (over 4,000,000 barrels of water)!

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MIDWEST
WELDING FITTINGS

Below are photographs of two of the many tests that have been made of Midwest Welding Fittings. The results are *always* the same . . . the seamless pipe to which the fittings are welded invariably bursts. There is *never* any sign of fitting failure or weakness.

There's good reason for this. We make elbows and tees of inherently stronger metal . . . the Midwest exclusive method of manufacture enables us to maintain greater minimum wall thickness, and to reinforce the fittings at points of greatest stress. For the many other advantages of Midwest Fittings, ask your Midwest distributor or write us for Catalog 54.

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Plants: St. Louis, Clifton, N. J. and Los Angeles

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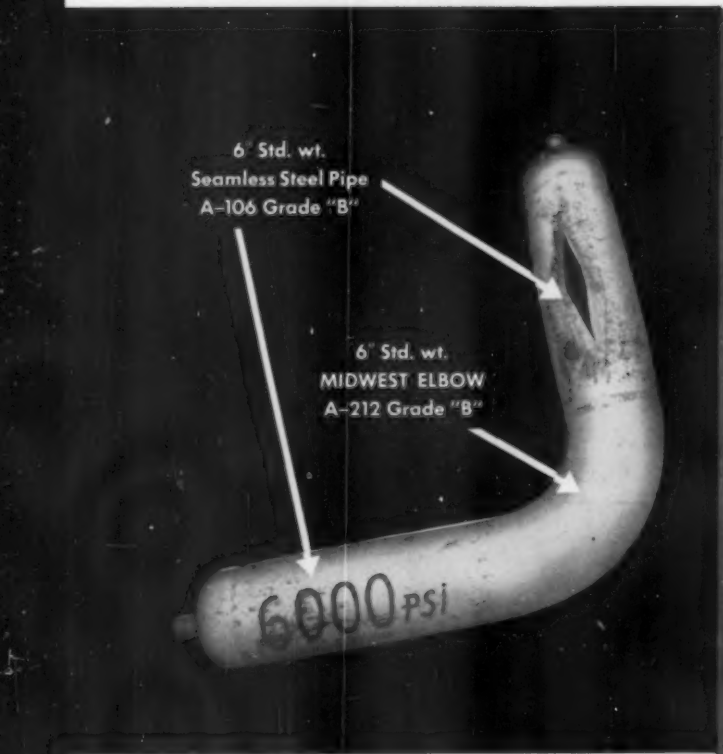
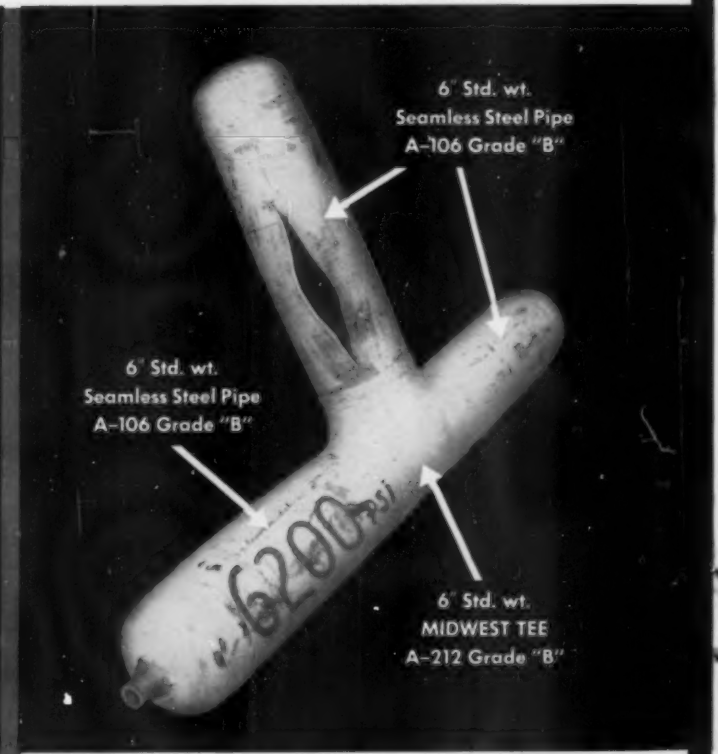


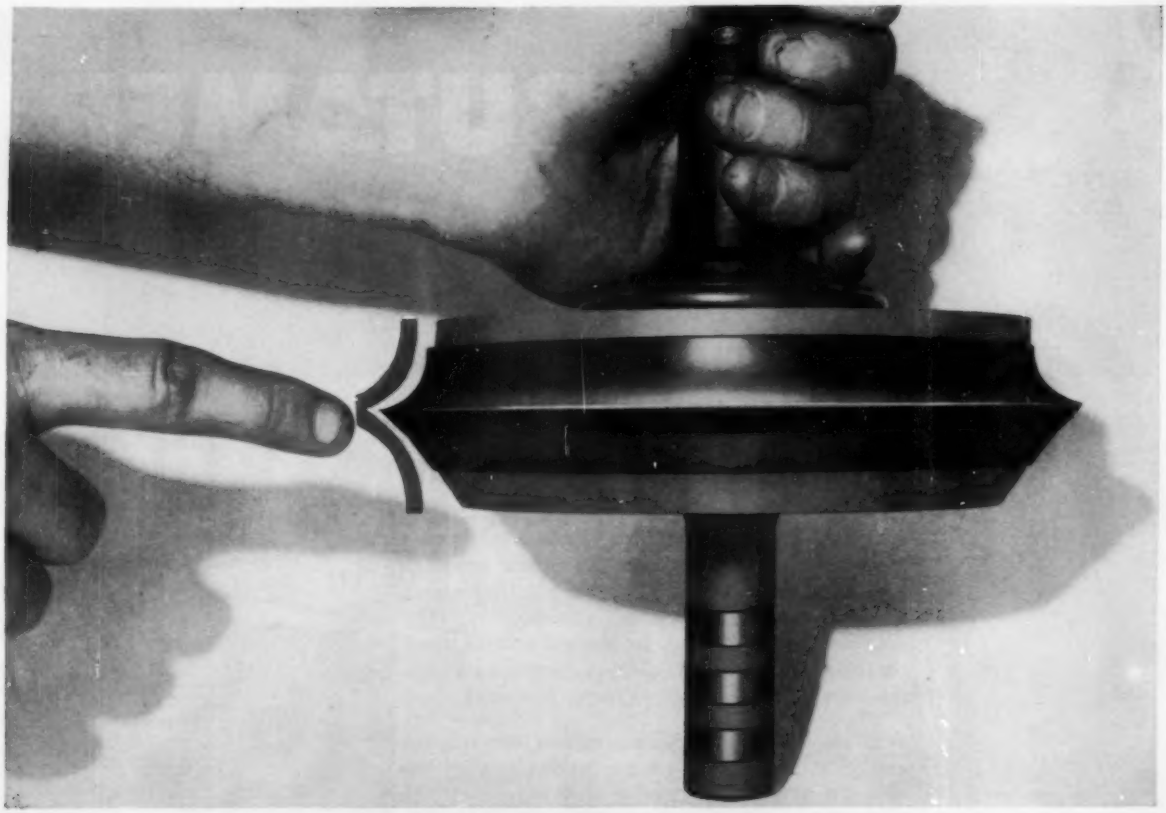
Typical bursting test of stock Midwest Welding Elbow. As is always the case, failure occurred in the seamless pipe while the elbow was undamaged. Bursting pressure was 6000 psi . . . considerably above the required code minimum for seamless pipe. (Minimum allowable bursting pressure for 6" standard weight A-106 Grade B seamless steel pipe is 4438 psi.)



Bursting test of Midwest Welding Tee taken at random from stock. As always, the failure occurred in the seamless pipe and not in the fitting. The non-shock internal bursting pressure of 6200 psi is well above the code minimum for seamless pipe. (Minimum allowable bursting pressure for 6" standard weight A-106 Grade B seamless steel pipe is 4438 psi.)

7761

MIDWEST **WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS**



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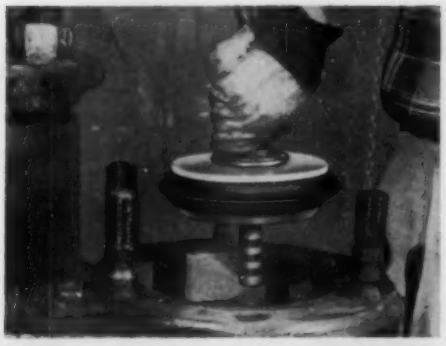

EVERY DRILLER who is using our new, exclusive double-angle inserts in American Iron Valve & Seat installations is reaping the benefits of these advantages:

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Increasing use of alkylate for blending into motor fuels makes these two up-to-the-minute processes highly important to petroleum refiners. Butamer is a new process for producing isobutane . . . "HF" Alkylation is an efficient, economical process which combines isobutane with olefins to produce alkylate, much in demand today as a motor fuel component.

With the advent of high compression ratio engines, usually starting at 9.5:1, motor fuel, especially those deficient in isoparaffins, have been associated with an unusual engine noise called "rumble." Further study reveals this rumble can be eliminated through the use of a better balanced fuel, namely using a fuel composed of a greater volume percentage of isoparaffins. Alkylation produces a high octane isoparaffin that also has good sensitivity, ignition point and combustion characteristics.

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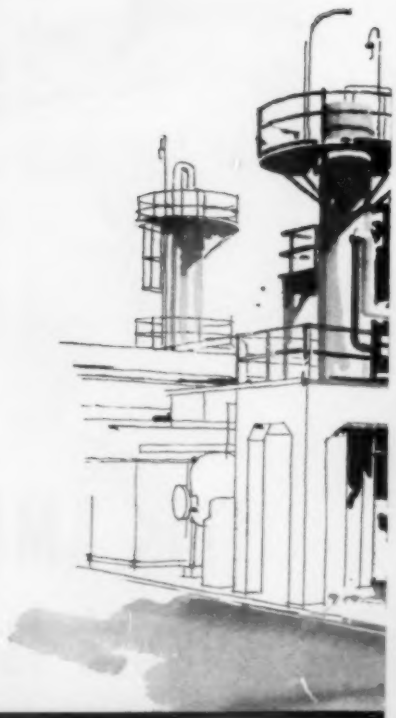

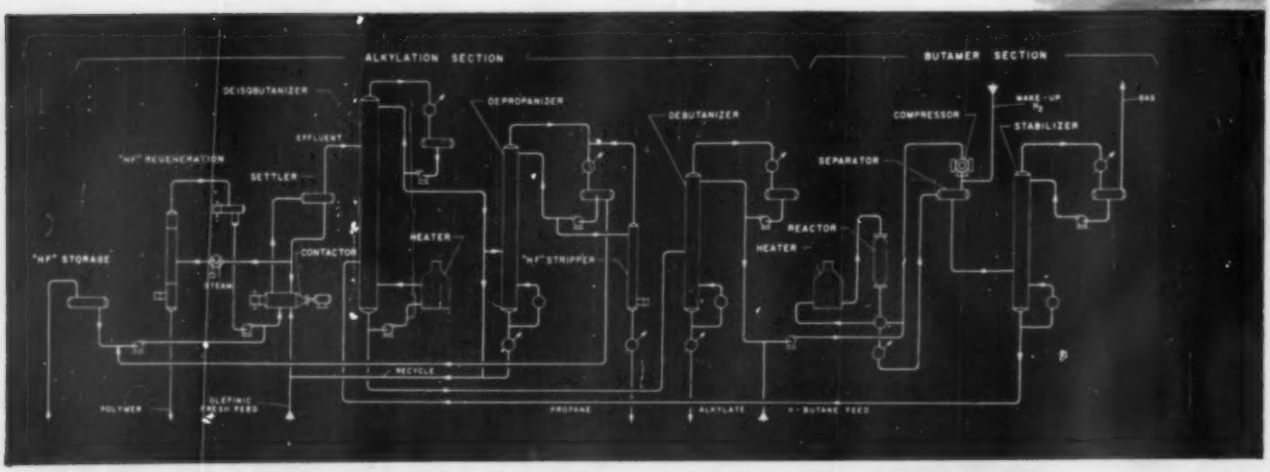

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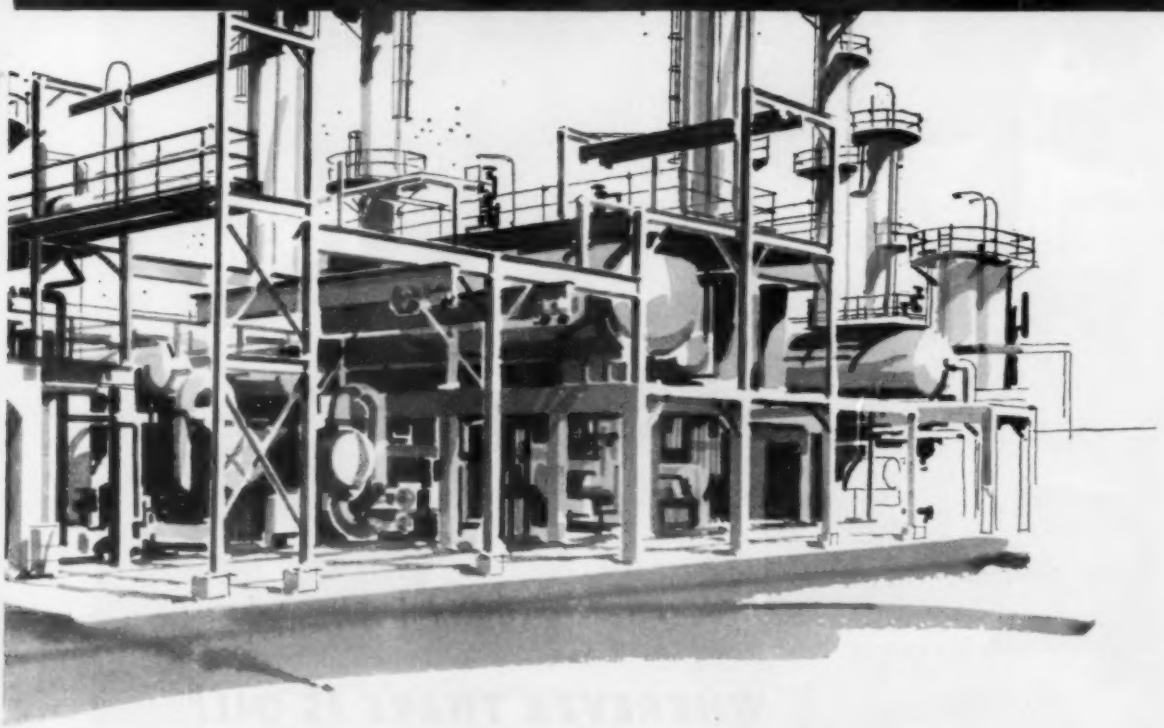
HF Alkylation



Butamer—Heart of this process is a noncorrosive, stable and rugged platinum-containing catalyst especially developed by UOP. Capable of operating at relatively low temperatures, its use assures a sufficiently high concentration of isobutane in the reactor effluent to eliminate excessive recycle of normal butane.

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HF Alkylation—"HF" Alkylation is a catalytic process which combines olefins such as propylene, butylenes, and amylenes with isoparaffins (usually isobutane) to form a mixture of branched chain hydrocarbons of higher molecular weight known as alkylate for aviation and motor fuel.

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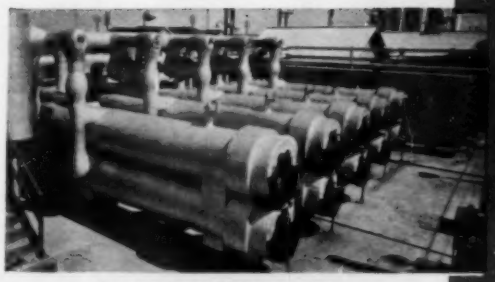

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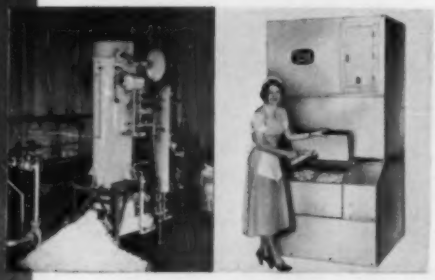

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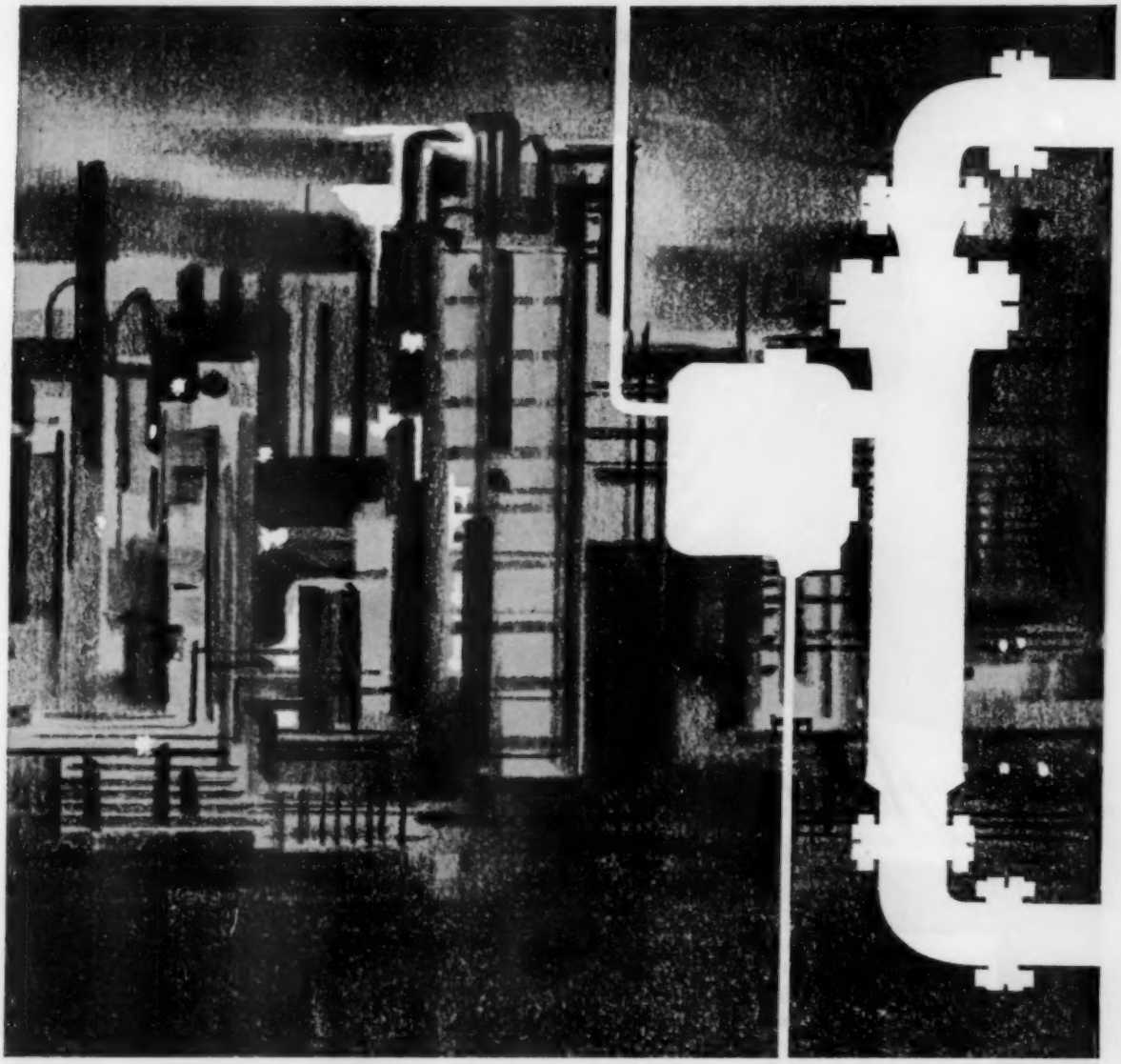

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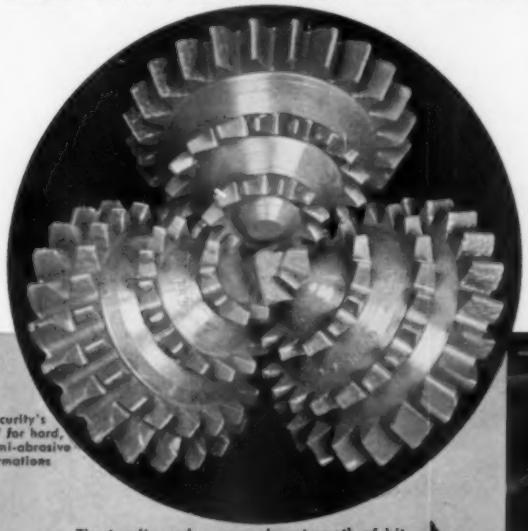

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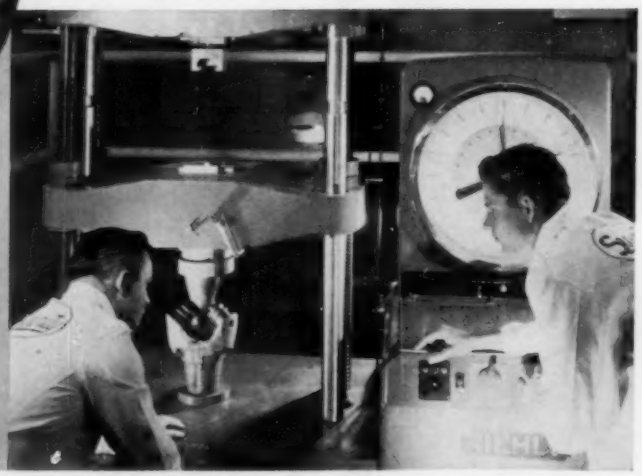
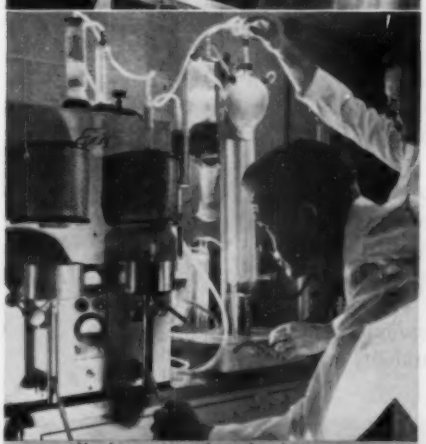


The crystalline alignment of steel, here being determined by X-ray diffraction, affects the ultimate performance where strength, fatigue, impact, and hardness are important factors.



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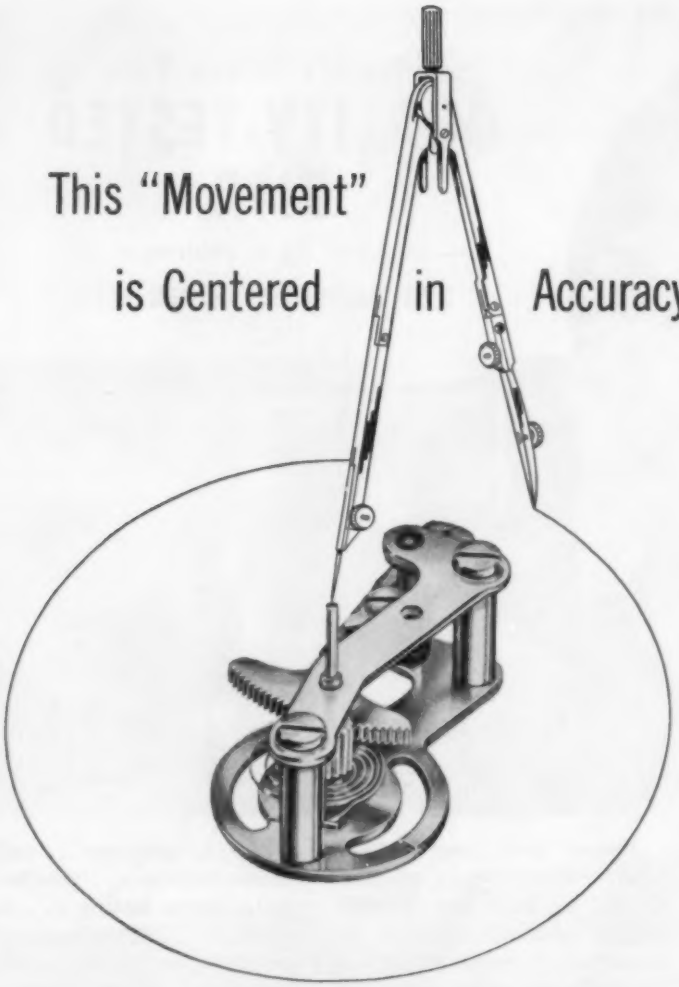

The rotary movement in Ashcroft Duragauges has a geared center shaft on which the pointer is mounted. When pressure flexes the Bourdon tube, the pointer is always positively positioned. You can rely on the Duragauge for precise accuracy in measuring pressure no matter how severe the conditions of service.

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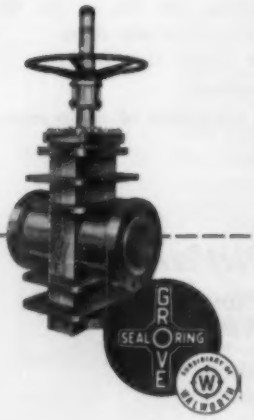

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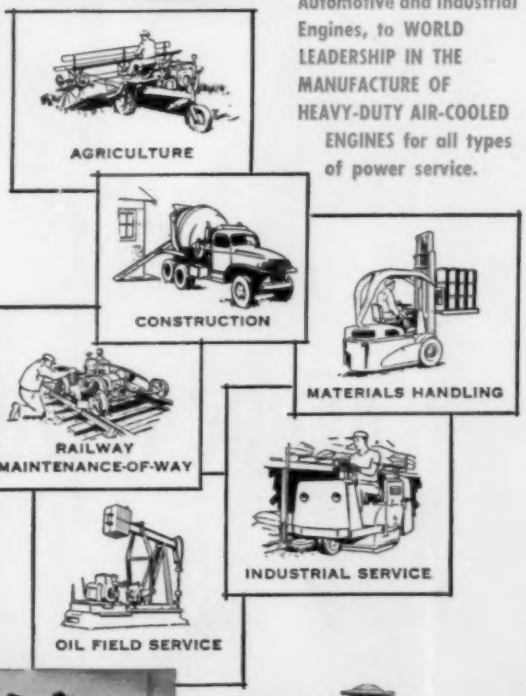
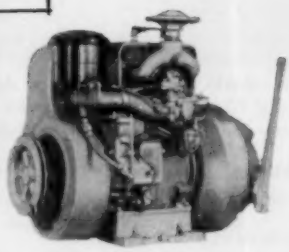


This 1914 Stutz Bearcat, one of the most famous and rugged cars of its day, was powered by a Wisconsin Heavy-Duty Water-Cooled Engine . . . a power leader of high recognition even at that early date.

This FWD Wisconsin-powered truck, known as "No. 28," was purchased in 1921 from Army Surplus, and after many years of service is now on display at the Halliburton Oil Cementing Co., in Oklahoma.



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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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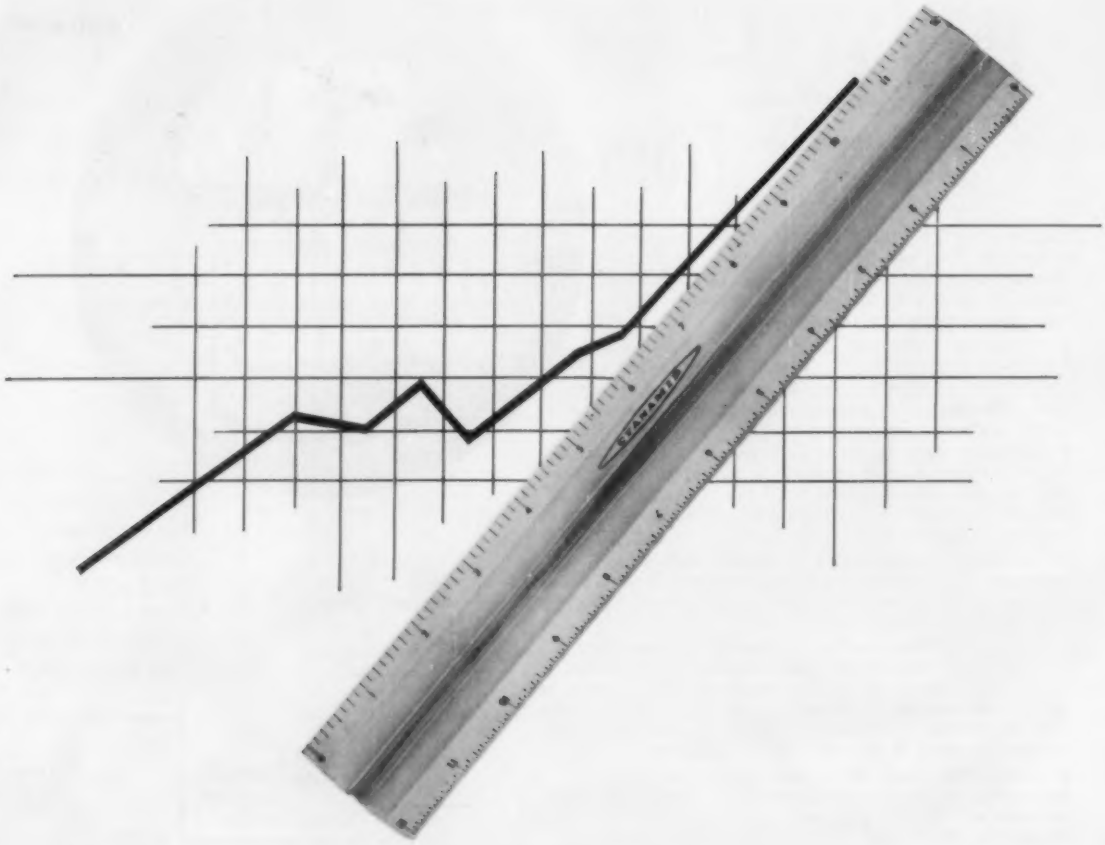
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

A8-6226-1PC



NOW AEROCAT® 2000 OFFERS A NEW MEASURE OF EFFICIENCY WITH CATALYST ECONOMY

Under certain operating conditions, such as the use of a cracking catalyst at a rate sufficient to reduce the effect of heavy metals, Cyanamid's new AEROCAT® 2000 Fluid Cracking Catalyst provides activity stability with greater economy than other low-cost catalysts.

In addition, AEROCAT 2000 offers these advantages over most other low-cost catalysts:

- *produces higher octanes*
- *has superior attrition resistance*
- *offers more uniform physical and catalytic properties*
- *produces lower coke*
- *has controlled bulk density for better fluidization*
- *has outstanding regeneration properties*
- *shows better selectivity*

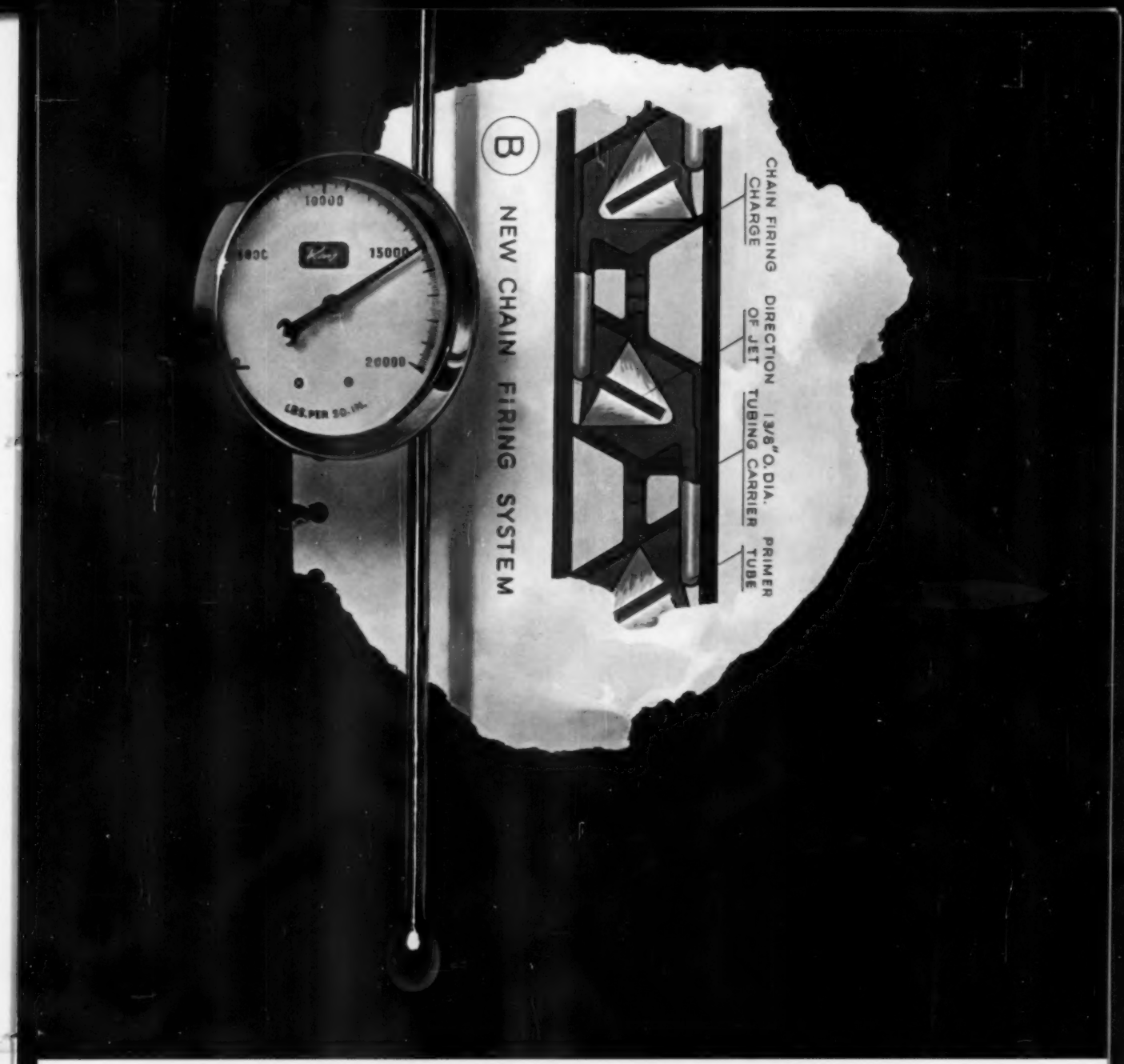
AEROCAT 2000 is made under the same controlled conditions by the same modern processes as AEROCAT® Fluid Cracking Catalyst and AEROCAT TRIPLE A® High Alumina Catalyst. It extends Cyanamid's line of cracking catalysts to provide high efficiency products designed to fit *all* operating conditions. For complete information and specifications, see Cyanamid's man with the golden rule.

Basic in Catalyst Chemistry

CYANAMID

AMERICAN CYANAMID COMPANY • REFINERY CHEMICALS DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

Originators of AEROCAT® Fluid Cracking Catalysts, AEROCAT TRIPLE A® High Alumina Catalysts, AEROCAT® 2000 Fluid Cracking Catalyst, AEROFORM® Fluid Hydroforming and Platinum Reforming Catalysts, AERO® HDS Catalysts, AERO® Specialty Catalysts, CYPAN® Drilling Mud Conditioner, AEROLUBE® Lubricating Oil Additives, AERONOX® Antioxidants, AEROSOL® Surface Active Agents.



Schlumberger leads in perforating too

All the resources and experience gained in more than 25 years in the industry are reflected in Schlumberger Perforating Services. When you call Schlumberger, you get the best—from gun design to the man on the job.

Superior Equipment:

The S-III Super Bullet Gun—leader in penetration.

The No-Plug Shaped Charge—with bimetallic liner for clean, free-flowing perforations.

The Capsule Jet—effective, easy to handle on big jobs in both thru-tubing and casing completions.

The Chain Jet—new development—without primacord—puts larger, more powerful charges in slim tubular carriers.

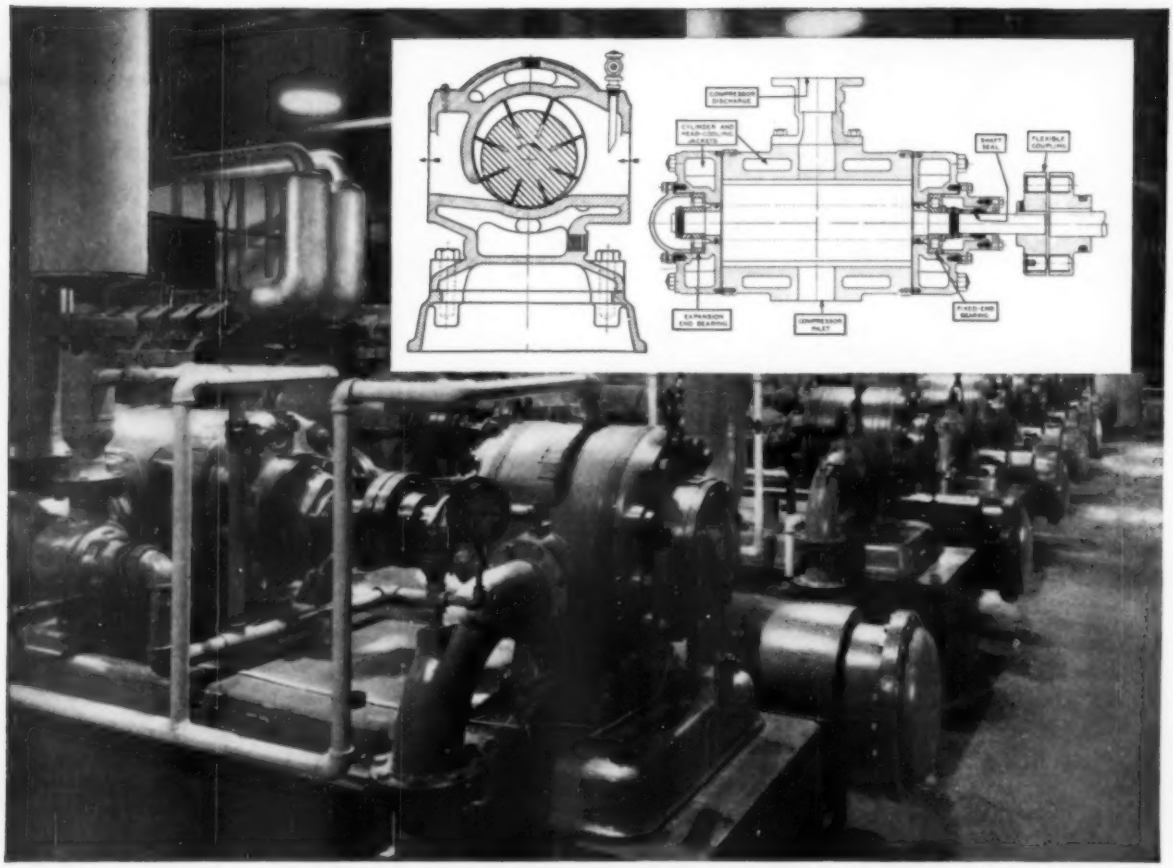
Safe—Efficient Operations—Performed by carefully trained engineers with the rugged Schlumberger field unit developed in more than one million service operations.

Available Everywhere—There is a Schlumberger service location in every oil-producing area.

There's no doubt about it! Schlumberger—the recognized leader in logging—leads in perforating too. Why not use the best when it costs no more?

THE EYES OF THE OIL INDUSTRY®

SCHLUMBERGER



HERE ARE 7 FULLER ROTARY COMPRESSORS

. . . in *any* quantity they are an investment in dependability

The wide and continuing acceptance of the Fuller Rotary Compressor in industry is based on a number of unique design features, eminently suited for day in and day out operation in any rugged situation. Indoors or out, its trouble-free operation makes for minimum maintenance and operating costs.

There are 8 good reasons why the Fuller Rotary Compressor enjoys such widespread use—they may easily serve as reasons why your next compressors should be Fuller Rotaries.

1. SIMPLICITY—Elimination of compressor valves, crankshafts, pistons and other moving parts greatly reduces the need for attention, adjustment and replacement. 2. PULSATION-FREE FLOW—Rotary compression eliminates pressure fluctuations and simplifies metering problems. 3. SUSTAINED PERFORMANCE—Blades are held out by centrifugal force, automatically compensating for wear, thus maintaining new-machine efficiency and capacity. 4. NON-VIBRATING—Rotary principle permits a design completely free of reciprocating parts, avoiding basic cause of vibration.

5. COMPACTNESS—Large capacity in relation to size results in lighter weight. 6. EASE OF INSTALLATION—In smaller sizes, no foundation is needed. Larger units need only concrete slab for foundation. Automatic safety controls are incorporated in package. 7. ECONOMY—Few moving parts of the compressor, and their accessibility, reduce maintenance to the minimum. 8. VERSATILITY—Unit can be operated at various conditions. Capacity variation of 50% can be obtained by change of speed with engine, turbine, or two-speed motor drives.

We'd like to send you fully-descriptive Fuller Compressor literature. It's yours for the asking.

FULLER COMPANY, 132 Bridge St., Catasauqua, Penna.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

There is a difference in sucker rods

For extremely heavy pumping loads.

This rod is the result of long research and field use to produce the very best rod for exceedingly heavy pumping. It is made of special alloy steel of exceptional yield strength and well-balanced physical properties.

Specify Jones Sucker Rods for *proved* longer life.

FOUR TYPES OF JONES SUCKER RODS FROM WHICH TO CHOOSE

Type	Identification	USE	DESCRIPTION	PHYSICAL PROPERTIES					
				Yield 1000 psi	Ultimate 1000 psi	% Elong. in 8"	% Red. of Area	Izod	Brinell Hardness
J-12	Protector ends painted BLUE	For heavy pumping loads under all conditions	Made from processed electric furnace steel with high yield strength and excellent fatigue resistance.	95-105	110-125	12-17	65-75	90-110	229-360
J-8	Protector ends painted BLACK	For extremely heavy pumping loads	A special alloy steel of exceptional yield strength and well-balanced physical properties.	100-115	120-135	10-15	50-60	65-85	240-360
J-7	Protector ends painted ORANGE	For medium to heavy pumping loads under all conditions	Called "standard of the industry". Strong, corrosion resistant nickle molybdenum steel, fully normalized, tempered, descaled and shot peened for further fatigue and corrosion resistance.	65-80	85-100	14-22	60-70	90-107	170-210
J-2	Protector ends painted WHITE	For medium to heavy pumping loads in non-corrosive fluids	High grade carbon manganese steel, fully normalized, descaled and shot peened to add strength and endurance.	60-75	90-105	18-24	60-70	60-90	160-210

Jones Pony Rods carry the same physicals as Jones Sucker Rods. Always use proved superior Jones Pony Rods with proved superior Jones Sucker Rods.

THE S. M. JONES COMPANY

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Sales Office: Enterprise Building,
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Export Sales Representatives:
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Dallas, Texas, and
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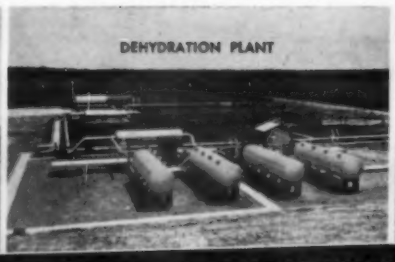

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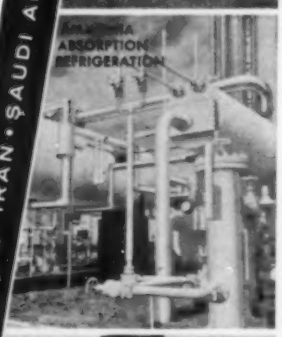
Efficiency Experts

Available on Short Notice...Will Travel!



The above lines ordinarily would apply to certain professional people, but in this case they refer to the many different items of BS&B Oil & Gas production Equipment which are world renowned for their high operating efficiency, reliability and profit to cost ratio.

Available in the United States through Black, Sivalls & Bryson, Inc., in Canada through its subsidiary, Black, Sivalls & Bryson, Ltd., and in other countries of the world through BS&B International, *these* "efficiency experts" are already at work in practically every oil and gas producing country in the world.

But no matter *where* the equipment is to be put on stream, it is specifically tailored to function at optimum efficiency and with maximum profit return on the operator's investment under the *specific* lease operating conditions existing at the point of destination.

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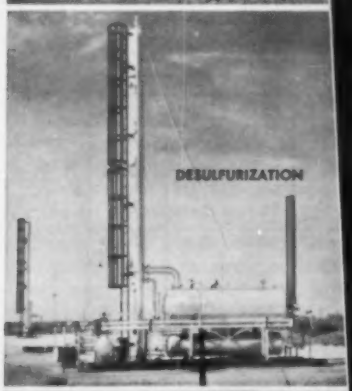
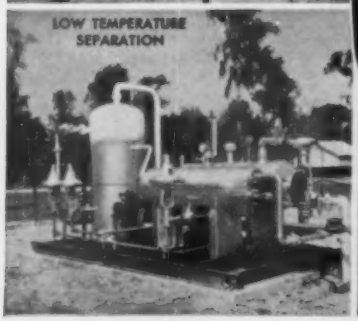
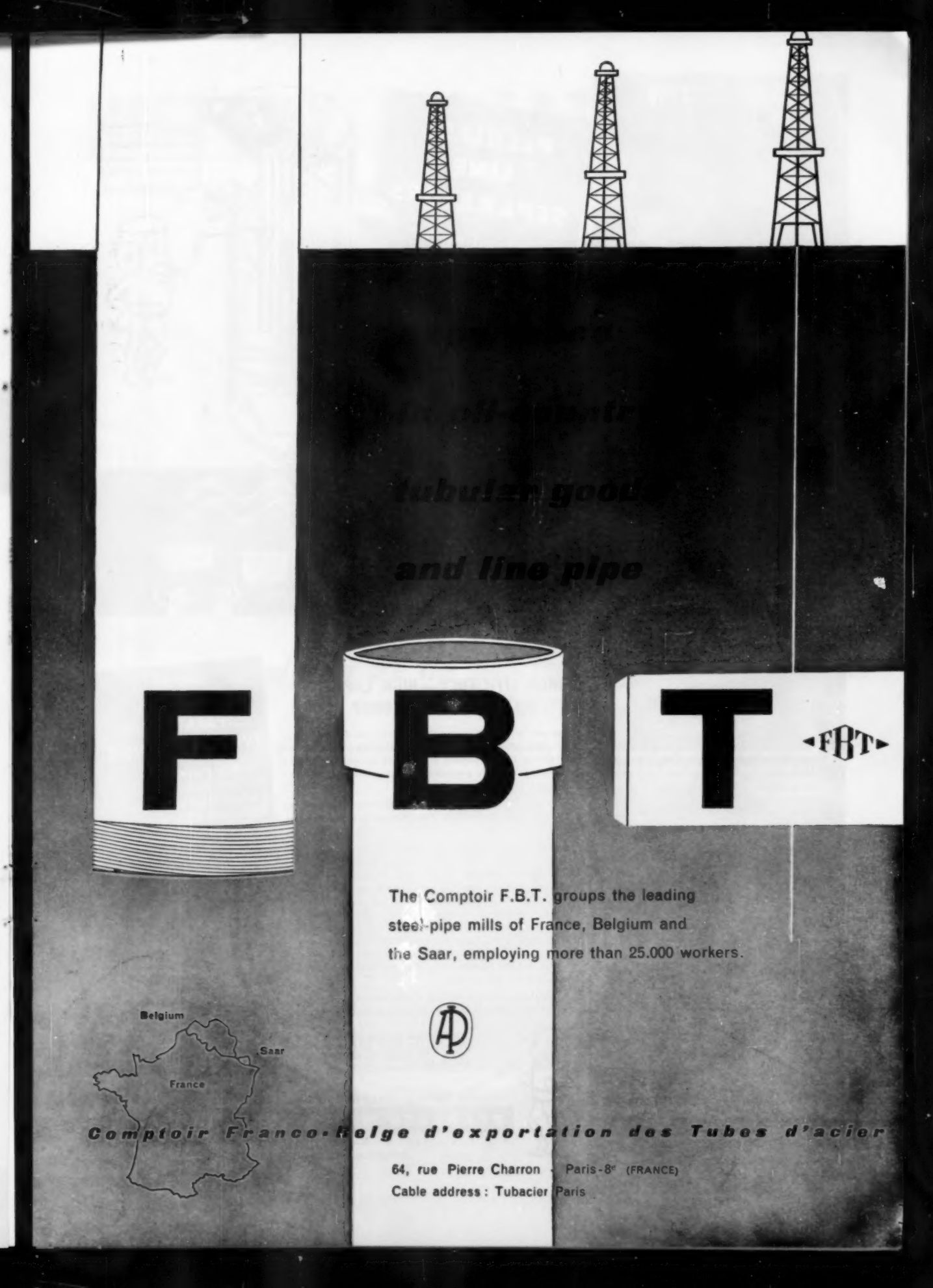
BS&B AROUND THE WORLD





"wherever there's oil, you'll find BS&B"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The Comptoir F.B.T. groups the leading steel-pipe mills of France, Belgium and the Saar, employing more than 25.000 workers.
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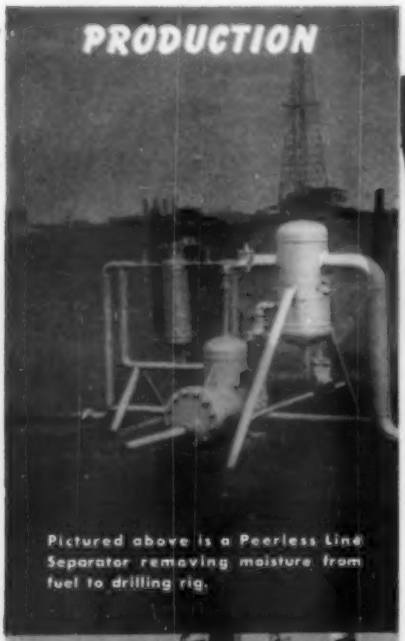
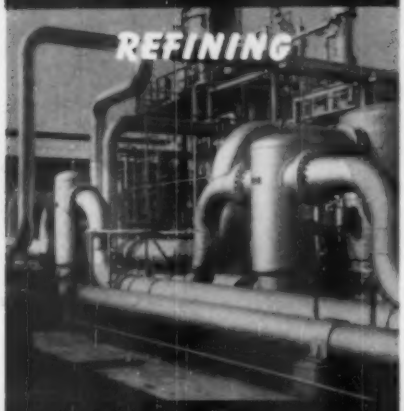
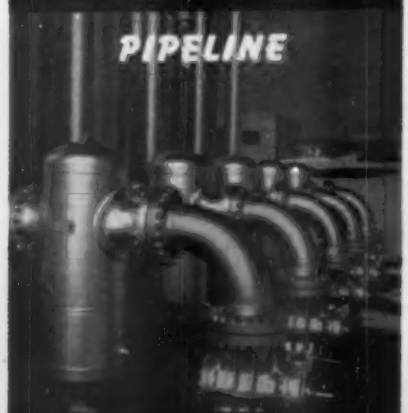


Pictured above is a Peerless Line Separator removing moisture from fuel to drilling rig.



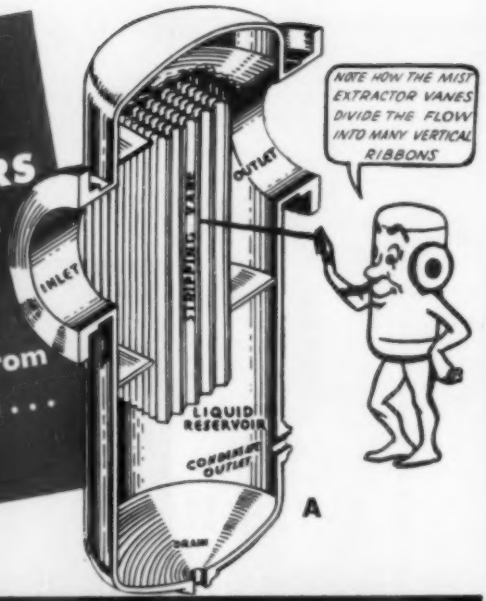
These two Peerless Line Separators are doing an efficient job of mist extraction in the Petrochemical plant in Kentucky.

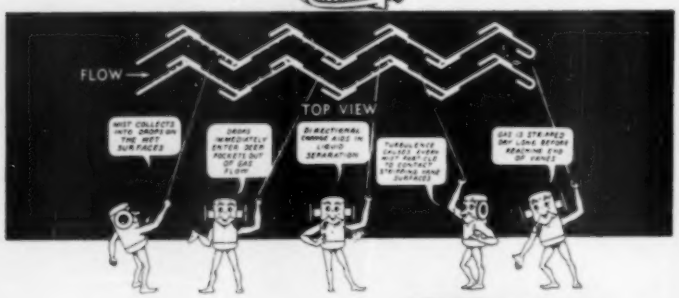


FIVE Peerless Line Separators are shown above as they handle carry over from large scrubbers.

PEERLESS LINE SEPARATORS

Outstanding for the efficient extraction of liquid mist from gas or steam . . .





HIGH EFFICIENCY — HIGH CAPACITY LOW PRESSURE DROP

Thousands of installations throughout the oil industry . . . production, pipeline, refining and petrochemical . . . prove the Peerless Line Separator principle to be one of the most outstanding methods available for the extraction of liquid gas, steam or air.

Drawing A above shows the arrangement of the vanes in the Separator. Drawing B is an illustration of the Peerless Principle.

The mist extractor combines the forces of impingement, centrifugal motion and surface tension to obtain its high efficiency. The path of the gas, etc., through the unit is constantly bending causing semi-violent turbulence and rolling of the gas against the walls of the vane. Impingement and centrifugal force combine to contact the droplets with the vanes, where they coalesce, and surface tension then causes them to cling to the vane's surfaces. Gravity and the impact of the gas steam then drive the droplets into the pockets where they roll down the vanes and out of the gas stream.

Through the Peerless method of mist extraction, the gas is stripped dry long before reaching the end of the vanes.

there's A PEERLESS SEPARATOR FOR EVERY REQUIREMENT

For any capacity
For any working pressure
For corrosive conditions
With removable vane units
With extra body length
With connections for accessory equipment
For pressure drop requirements of less than 6" water
For any vapor-liquid ratio
For any piping requirement

SPECIAL DESIGN SEPARATORS FOR ANY REQUIREMENT

FOR FURTHER INFORMATION ON THE USE OF PEERLESS LINE SEPARATORS PLEASE WRITE FOR NAME OF NEAREST PEERLESS ENGINEER.

PEERLESS MFG. CO.

"OVER 20,000 SEPARATORS and SCRUBBERS IN SERVICE"

PEERLESS MANUFACTURING CO.

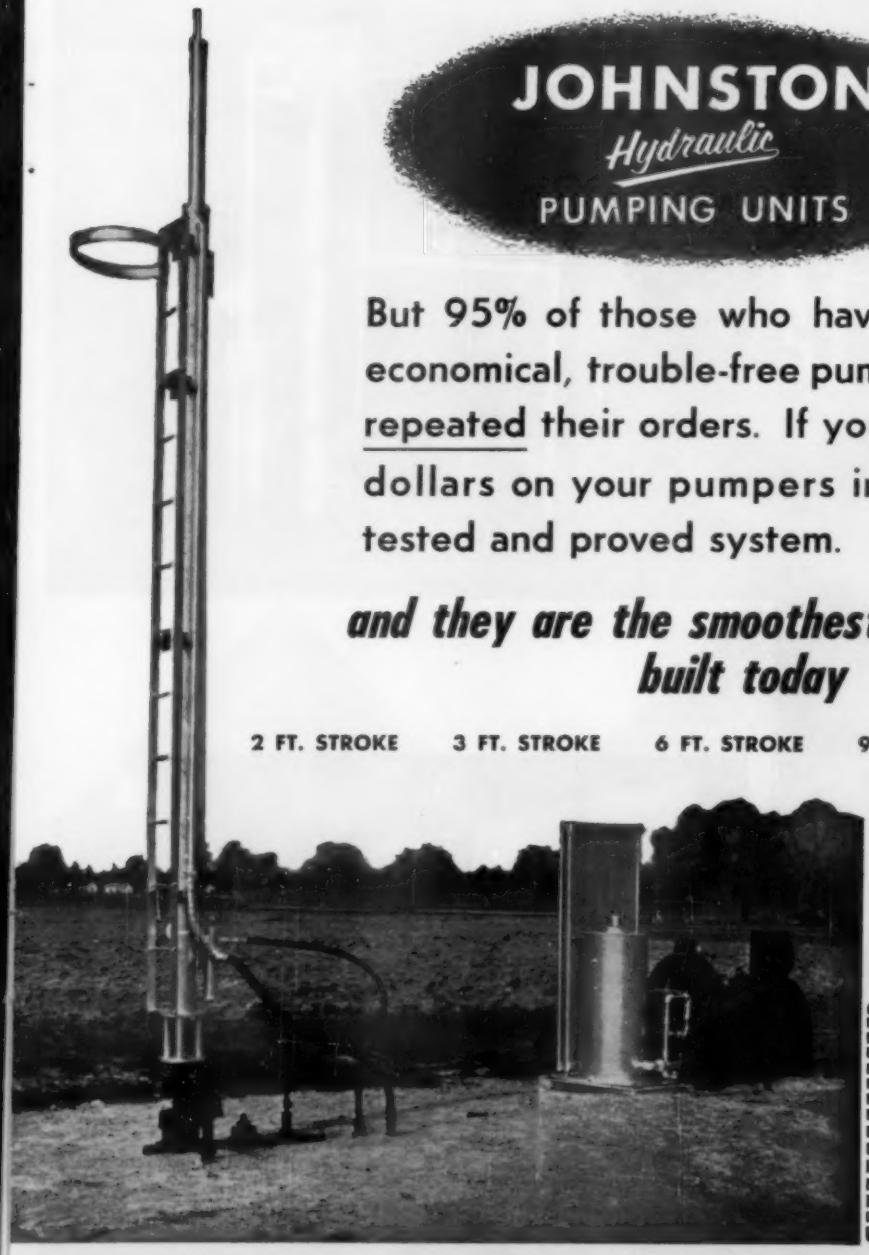
P. O. BOX 13165 ★ DALLAS 20, TEXAS ★ FLeetwood 2-8431

REPRESENTATIVES IN ALL PRINCIPAL CITIES

HISTORY REPEATS ITSELF

THERE HAD TO BE A FIRST WITH EVERY USER OF

JOHNSTON
Hydraulic
PUMPING UNITS



But 95% of those who have bought this economical, trouble-free pumping unit have repeated their orders. If you want to save dollars on your pumpers investigate this tested and proved system.

and they are the smoothest running units built today

2 FT. STROKE **3 FT. STROKE** **6 FT. STROKE** **9 FT. STROKE** **12 FT. STROKE**

MAIL THIS COUPON FOR SPECIAL PAMPHLET CONTAINING APPLICATION CHART AND MECHANICAL FEATURES OF JOHNSTON HYDRAULIC PUMPS . . . NO OBLIGATION.

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Please mail special pamphlet on Johnston Hydraulic Pumps to:

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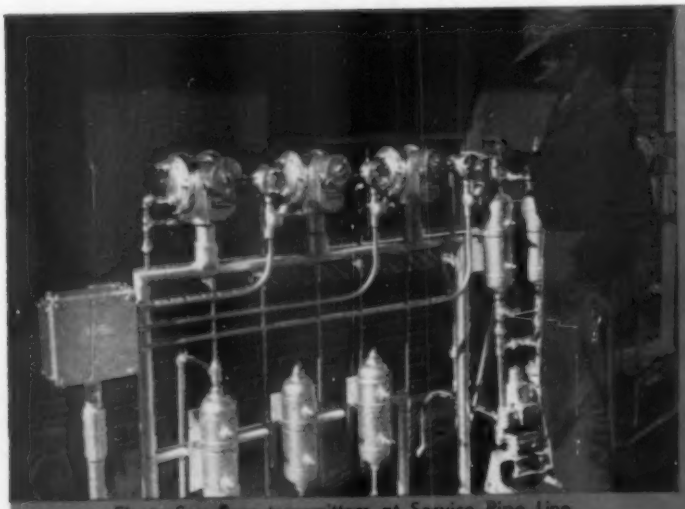
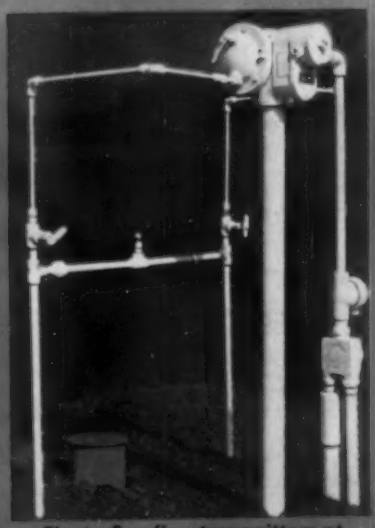
pressure and flow data

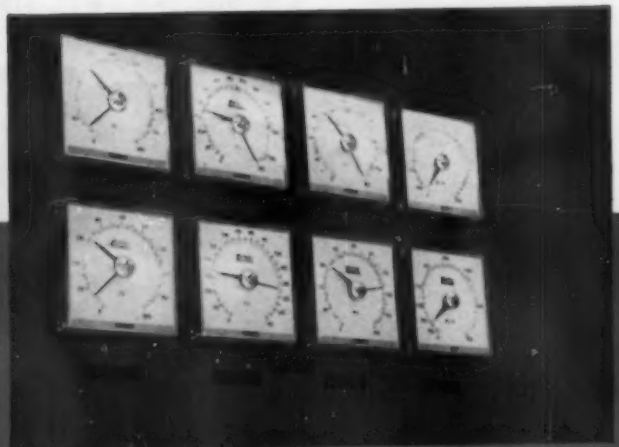


ElectroSyn flow transmitters at Service Pipe Line Company's pumping station, Drumright, Oklahoma.



ElectroSyn flow transmitters at Service Pipe Line's Blake Station (Washington County, Oklahoma)

Satellite data logging of pressures and flows at Drumright Station.



ElectroSyn flow and pressure indicators and digital encoders at Blake Station.

3 to 4 times more accurate with

NORWOOD CONTROLS

ELECTROSYN

Norwood Controls' ElectroSyn digital telemetering transmitters are playing an important part in digital data handling for leading pipeline companies. The ElectroSyn System's digital approach automatically makes available — for logging — pressure and flow information with 3 to 4 times greater accuracy than can be attained by use of analog equipment. This increased accuracy results in considerably higher overall operating efficiency.

Digital pressure and flow values are transmitted in encoded form from pumping stations along the line to central logging points by data handling and checking equipment.

The ElectroSyn null-balance System consists of electro-magnetic transmitters and feedback units combined with magnetic amplifiers. Servo-indicators actuate adjustable high and low alarm contacts which are visible and can be set from the front of the instrument. Shaft positions of the servos are read out by encoders . . . linear encoders for pressure and square law encoders for flow. Additional encoders can be actuated to provide rate-of-change alarms.

More and more pipeline companies are choosing ElectroSyn Systems because they offer:

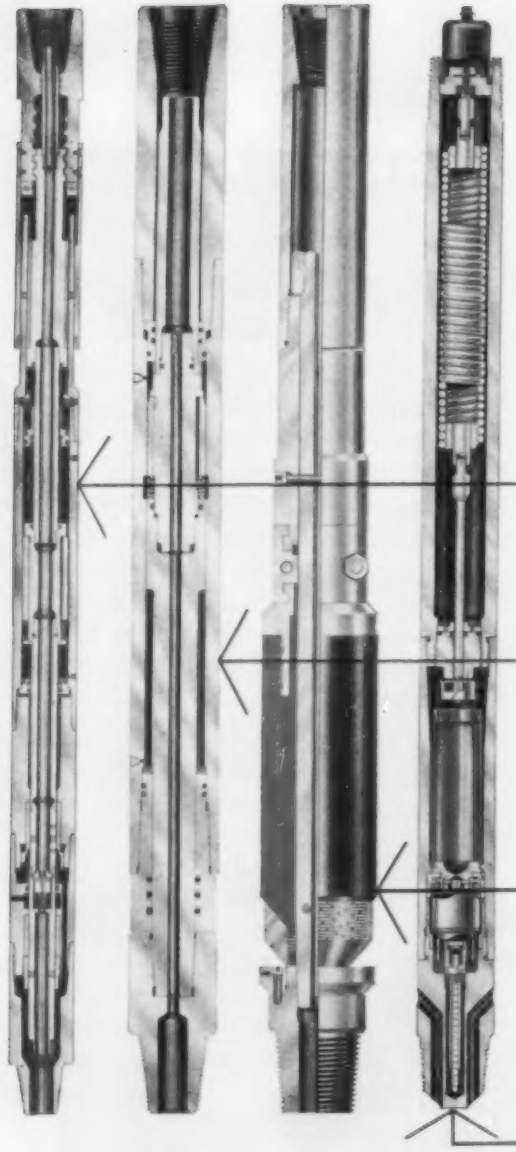
- Higher reliability
- Lower maintenance
- Flexibility of application
- Rugged electro-magnetic system
- Can withstand static overload of 200% of rated pressure with no zero shift
- Remote transmission
- Explosion-proof transmitters.

Write for ElectroSyn Bulletin B257 — Norwood Controls Unit, Detroit Controls Division, 942 Washington St., Norwood, Mass.

AMERICAN-Standard PRODUCTS

AMERICAN-Standard

DETROIT CONTROLS DIVISION



the tool the test designed

The Johnston Shut-In Hydraulic Tester. Designed for positive operation under a wide range of testing conditions. One-piece construction means quicker "make-up" and "break-down" saving valuable rig time.

The newest Johnston Jar, the Type HS-1 Hydraulic Jar, answered the needs dictated by drill stem testing operations. More jarring action from this "easy to maintain" tool. Shorter for "easier handling" and faster "make-up." Designed to consistently deliver and withstand innumerable shocking blows.

The Johnston Bob-Tail Packer. Its design features a reduction of the necessary rubber diameter while assuring a completely effective seal. The increased by-pass area improves running characteristics and speeds up running and pulling time. In washed-out or out-of-gauge holes a larger packer and packing element gives the same advantages.

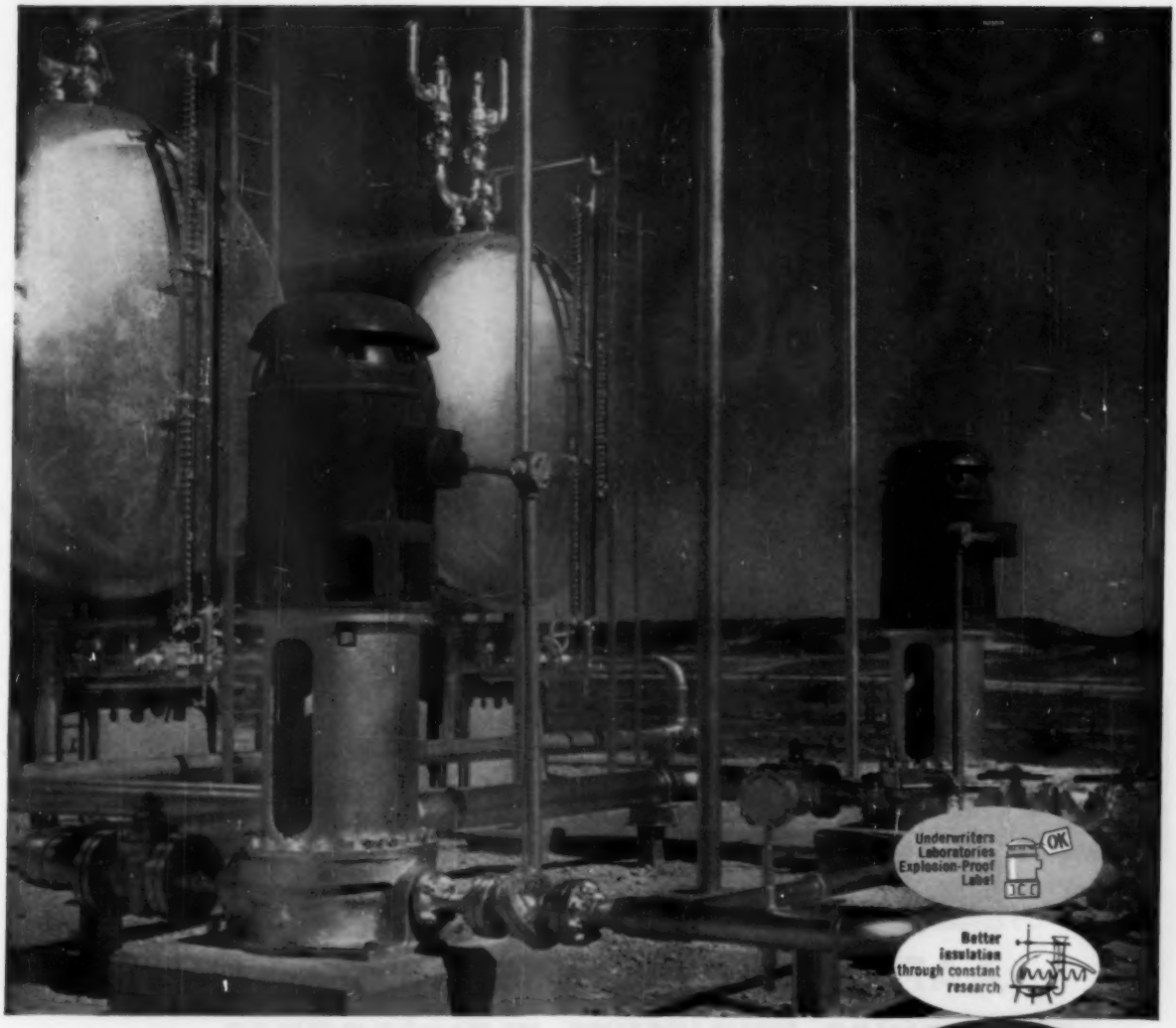
Johnston Type "T" Pressure Recorder. Unfailing accuracy, sensitivity and dependability under all types of formation testing conditions. Extensive laboratory and field tests proved the Johnston Tension Type recorder to be more accurate and dependable, consistently, under all conditions.

Johnston's thirty years of manufacturing and testing know-how is easily recognized in The Tool The Test Designed. Each piece of Johnston equipment is designed to meet the requirements of the test under all types of well conditions.

Rely on Johnston for all your drill stem test needs always. Johnston Testers, Inc., Houston, Texas; Long Beach, California; Calgary, Alberta, Canada. Export Sales Office, Houston, Texas.

A WORLD OF EXPERIENCE

JOHNSTON TESTERS



Here's dependable all-weather power

Louis Allis vertical motors are designed for outside petroleum installations

Here's a pump drive keyed to match the particular specifications of the petroleum industry.

Louis Allis vertical solid-shaft motors are explosion-proof for operation in hazardous locations, and corrosion-resistant to ward off both the etching acids in cat-cracking plants and the corroding action of salt spray at sea-exposed installations.

Tough, impervious insulation plus well-designed fully-enclosed construction give ample protection against weather, including dust- or rain-storms.

These motors are no problem for maintenance men, either. Easily mounted and wired up, they require little care afterwards. Tested quality bearings and ample lubrication reservoir keep them trouble-free. The locked bearing construction assures long life.

Louis Allis has a complete line of Explosion-Proof motors, with speeds to 3600 rpm., and sizes up to 600 hp. Ask for Bulletin 800 at your nearby Louis Allis District Office or write The Louis Allis Co., 449 East Stewart Street, Milwaukee 1, Wisconsin.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

Ten AAF Cycoils deliver clean air to the 660 hp. engines driving pumps at the Ward-Estes Water Flood Project.

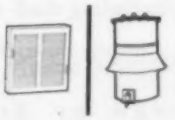
AAF Cycoils protect engines—require minimum maintenance

When engines are driving pumps for high-volume water injection used in secondary recovery, down-time means decreased production. That's why only the best protection against dust and dirt is good enough. At the Ward-Estes Water Flood Project, Ward County, Texas, ten AAF Cycoils do the job.

AAF Cycoil oil bath air cleaners require an absolute minimum of maintenance. It is not necessary to tear them down for cleaning. Due to self-cleaning action of the filter pads, the only maintenance needed is the periodic replacement of oil. Records show that Cycoils have been on the job in some applications for as long as 20-years without being dismantled for maintenance.

Cycoils offer many advantages—uniform air delivery, constant efficiency, low operation resistance, minimum maintenance. Get all the facts on AAF Cycoil oil bath air cleaner right away. Write today for Bulletin 136.

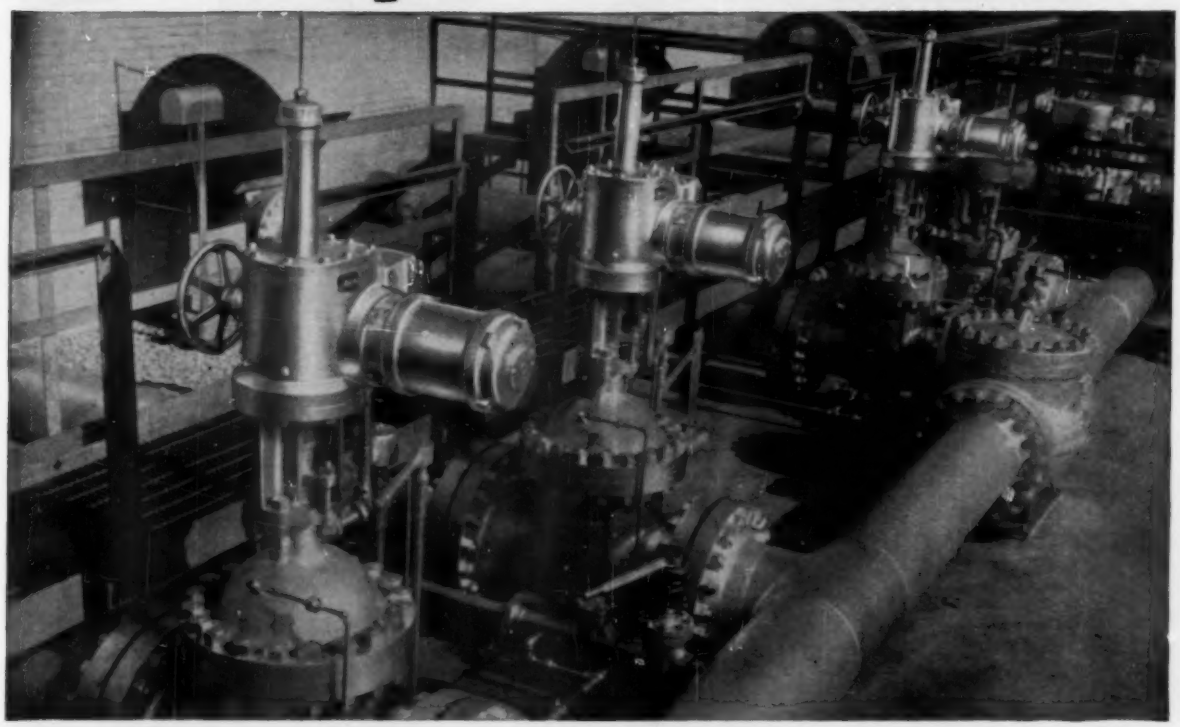
BETTER AIR IS OUR BUSINESS



AAF American Air Filter COMPANY, INC.

444 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

LimiTorque VALVE OPERATORS...



. . . for mainline crude-oil pipeline service at Cushing, Okla. Pumping Station of Shell Pipeline Co.

The valves shown above are 12" Venturi type manufactured by Darling Valve & Manufacturing Co., and they are push-button opened and closed by LimiTorque Motorized Valve Controls . . . dependably, safely and speedily. High pressure gas and oil transmission lines and refineries throughout the World are using LimiTorque to automatically open and close valves from a conveniently located control point—eliminating guesswork and reducing labor costs. One man can operate any type of valve quickly and dependably in remote, inaccessible or hazardous locations; thus vital pipeline and refinery operating procedure can be handled easily by key personnel, safely and economically . . . Also, LimiTorque eliminates any possible damage to vital valve parts in closing, due to its unique torque limiting mechanism. LimiTorque may be actuated by any available power source, such as Electricity, Oil, Gas, Air or Water; and is available for Micro-wave control. LimiTorque controls can be field-mounted on existing valves—contact your valve manufacturer, or nearest sales-engineering office.

Cushing Station is the initiating station on the Ozark Pipe Line System, operated by Shell Pipe Line Corporation for itself and as contractor for the other undivided interest owner, The Texas Pipe Line Co.

Send for Catalog L-550, and please use your Business Letterhead when requesting a copy.

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PHILADELPHIA GEAR CORPORATION

ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS

Limitorque Corporation • Philadelphia

CONTINENTAL RED SEALS *"Stand Up and Take It"* ON THE TOUGHEST OIL FIELD JOBS

SEE OUR EXHIBIT
International Petroleum Exposition
MAY 14-23, 1959
Tulsa, Oklahoma

GASOLINE AND LPG ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
N56	4	2¼	3½	56	14.4 @ 2200 RPM
N62	4	2⅜	3½	62	15.3 @ 2200 RPM
Y69	4	2½	3½	69	21.4 @ 2400 RPM
Y91	4	2⅞	3½	91	28.5 @ 2400 RPM
Y112	4	3 3/16	3½	112	32.0 @ 2400 RPM
F124	4	3	4⅜	124	36.5 @ 2400 RPM
F140	4	3 5/16	4⅜	140	42.0 @ 2400 RPM
F162	4	3 7/16	4⅜	162	49.0 @ 2400 RPM
F186	6	3	4⅜	186	60.5 @ 2400 RPM
F209	6	3 5/16	4⅜	209	68.0 @ 2400 RPM
F226	6	3 5/16	4⅜	226	73.0 @ 2400 RPM
F244	6	3 7/16	4⅜	244	79.0 @ 2400 RPM
M271	6	3⅝	4⅜	271	86.2 @ 2400 RPM
M290	6	3⅝	4⅜	290	92.2 @ 2400 RPM
M330	6	4	4⅜	330	104.4 @ 2400 RPM
M363	6	4	4 13/16	363	128.9 @ 2800 RPM
B371	6	4⅛	4⅝	371	110.0 @ 2400 RPM
B427	6	4 5/16	4⅞	427	127.0 @ 2400 RPM
*Z129	4	3⅛	3⅞	129	35.0 @ 2000 RPM
*Z134	4	3 5/16	3⅞	134	39.5 @ 2000 RPM
G134	4	3⅛	4⅜	134	35.0 @ 2000 RPM
G157	4	3⅜	4⅜	157	40.0 @ 2000 RPM
*G174	4	3 9/16	4⅜	174	54.0 @ 2000 RPM
*G193	4	3⅝	4⅜	193	59.4 @ 2000 RPM
*E201	4	3⅝	4⅞	201	65.9 @ 2400 RPM
*E208	4	3 11/16	4⅞	208	67.8 @ 2400 RPM
H227	4	3⅝	5½	227	54.0 @ 1800 RPM
H243	4	3⅜	5½	243	57.9 @ 1800 RPM
*H260	4	3⅞	5½	260	62.0 @ 1800 RPM
*H277	4	4	5½	277	66.1 @ 1800 RPM
K363	6	4	4 13/16	363	123.0 @ 2400 RPM
*J382	4	4½	6	382	74.0 @ 1400 RPM
*U403	4	4⅝	6	403	110.0 @ 2000 RPM
T371	6	4⅛	4⅝	371	119.0 @ 2400 RPM
T427	6	4 5/16	4⅞	427	140.0 @ 2400 RPM
U501	6	4½	5¼	501	160.0 @ 2400 RPM
R513	6	4½	5⅝	513	164.3 @ 2400 RPM
R572	6	4⅝	5⅝	572	182.4 @ 2400 RPM
R602	6	4⅞	5⅝	602	191.7 @ 2400 RPM
V603	8	4⅜	4¼	603	240.0 @ 2800 RPM
S749	6	5⅜	5½	749	217.0 @ 2200 RPM
S820	6	5⅝	5½	820	237.0 @ 2200 RPM

CUSHIONED POWER DIESEL ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
*ZD129	4	3⅛	3⅞	129	34.0 @ 2000 RPM
GD157	4	3⅜	4⅜	157	39.0 @ 2000 RPM
*GD174	4	3 9/16	4⅜	174	42.5 @ 2000 RPM
*GD193	4	3⅝	4⅜	193	55.5 @ 2200 RPM
*ED201	4	3⅝	4⅞	201	46.8 @ 2000 RPM
*ED208	4	3 11/16	4⅞	208	61.5 @ 2200 RPM
HD243	4	3⅜	5½	243	68.9 @ 2200 RPM
*HD260	4	3⅞	5½	260	74.0 @ 2400 RPM
*HD277	4	4	5½	277	79.0 @ 2400 RPM
*JD382	4	4½	6	382	87.4 @ 2000 RPM
*UD403	4	4⅝	6	403	91.5 @ 2000 RPM
TD427	6	4 5/16	4⅞	427	132.0 @ 2200 RPM
RD572	6	4⅝	5⅝	572	154.0 @ 2000 RPM
VD603	8	4⅜	4¼	603	197.0 @ 2500 RPM
SD802	6	5 9/16	5½	802	202.0 @ 1800 RPM

*Available for industrial applications only.

No matter what the exact requirement of the job, there's a Continental Red Seal model engineered and built to meet it down to the last detail. The industrial engine power range is a broad one, with models at closely-spaced levels—14 to 240 horsepower—and they're available for operation on all standard fuels. Each is the product of more than 56 years' engine-building experience—each with the in-built stamina to "stand up and take it" on the toughest oil field jobs year after year—and each backed by parts and service facilities that reach around the world.

6 EAST 45TH ST., NEW YORK 17, NEW YORK • 3817 S. SANTA FE AVE., LOS ANGELES 58, CALIF.
6218 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 1252 OAKLEIGH DR., EAST POINT (ATLANTA) GA.

Continental Motors Corporation
MUSKEGON • MICHIGAN

ARE YOU GETTING YOUR SHARE OF THE HIGH OCTANE MARKET?

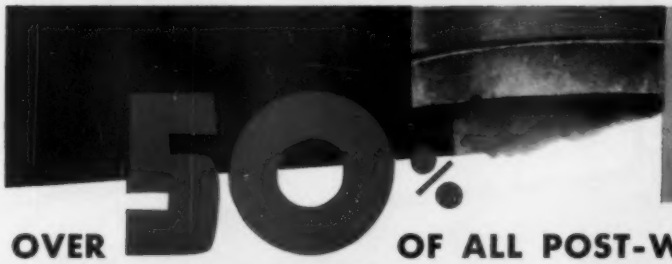
The consumption of Alkylate is growing for both government and civilian use, and this demand is expected to continue, at least into the middle 1960s. To get your share of the high octane market, consider adding an Alkylation Unit to your facilities as soon as possible.

The Oil and Gas Journal says, "Of the five typical high-quality blends which go into premium gasoline, alkylate is by far the best performer . . . more and more refiners are being pushed to include alkylate in their motor fuels. Heavy competition . . . is responsible for the new emphasis on alkylation."

WHY ALKYLATE IS THE KEY TO CURRENT GASOLINE BLENDS . . .

	Research octane (RON)	Motor octane (MON)	Sensitivity (RON minus MON)	Road octane (Union town)
Alkylate	103.0	104.5	−1.5	107.5
Reformate extract	103.7	94.0	9.7	103.5
C_5 plus reformate	103.0	93.5	9.5	102.5
C_6 plus reformate	100.0	91.7	8.3	100.0
Catalytic cracked	99.0	87.5	11.5	98.0

Reprinted courtesy The Oil and Gas Journal (Aug. 4, 1958)



OVER 50% OF ALL POST-WAR HF ALKYLATION UNITS OPERATING IN NORTH AMERICA WERE DESIGNED, ENGINEERED AND BUILT BY TRECO*

The Refinery Engineering Company has designed, engineered and constructed more HF alkylation units than all other companies combined.

THE TRECO LIST INCLUDES:

Shell Oil Company of Canada	1500 BPSD
NCRA	1522 BPSD
Cosden Petroleum Company	2068 BPSD
DX-Sunray (Tulsa)	2470 BPSD
DX-Sunray (Duncan)	3500 BPSD
CRA	1106 BPSD
Anderson-Prichard Oil Corp.	2150 BPSD
Bell Oil & Gas Company	1000 BPSD
The Carter Oil Company	2300 BPSD

Treco, with an outstanding record of fast refinery completion, can have your alkylation unit on stream QUICK. A telegram, telephone call or letter will bring complete information.

*to September 30, 1958

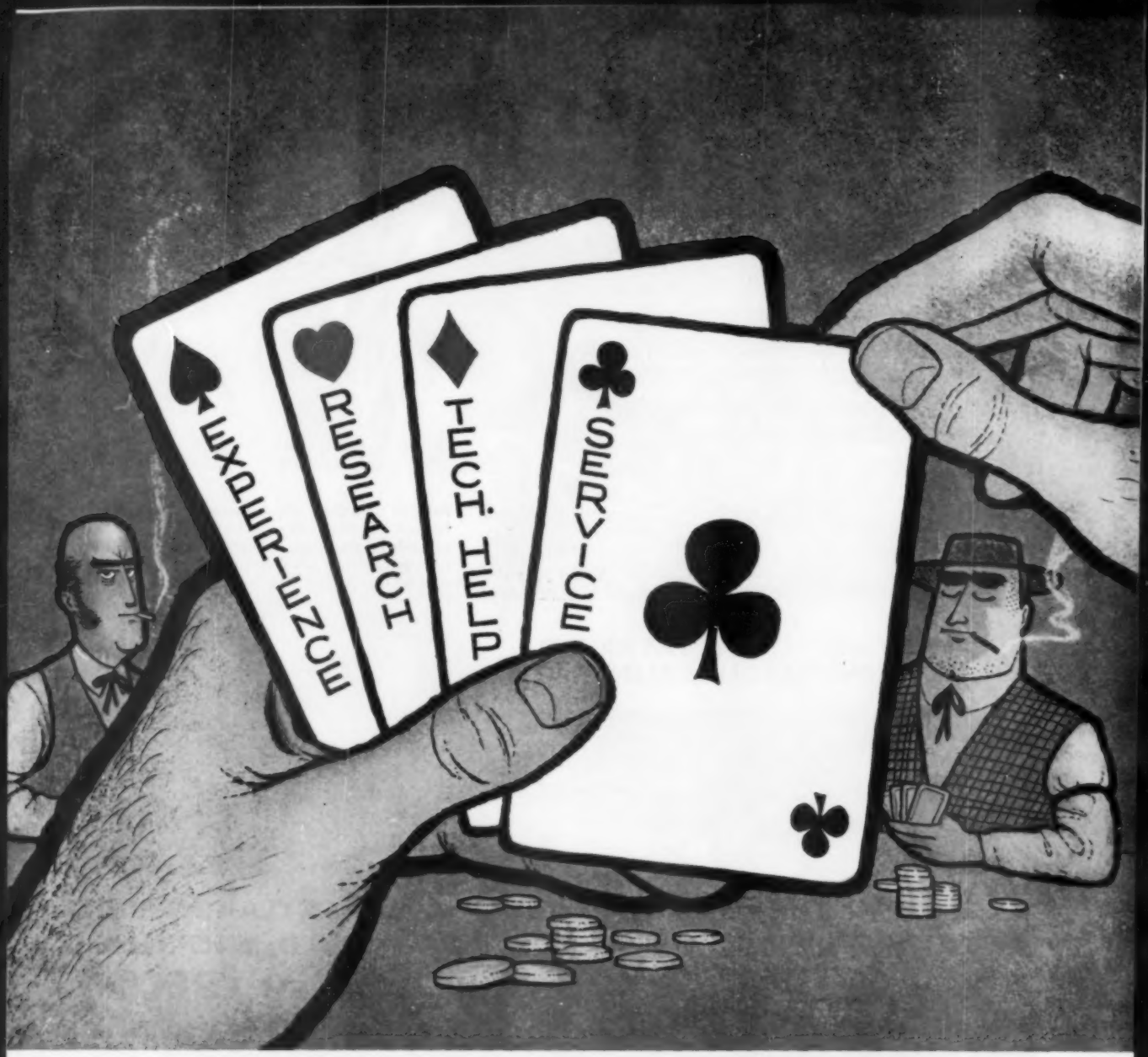
....talk with the TRECO man.....

TRECO

A DIVISION of VITRO CORPORATION of AMERICA

The REFINERY ENGINEERING Company

FARMINGTON NEW YORK TULSA TORONTO



In the catalyst game
Davison deals you the winning hand

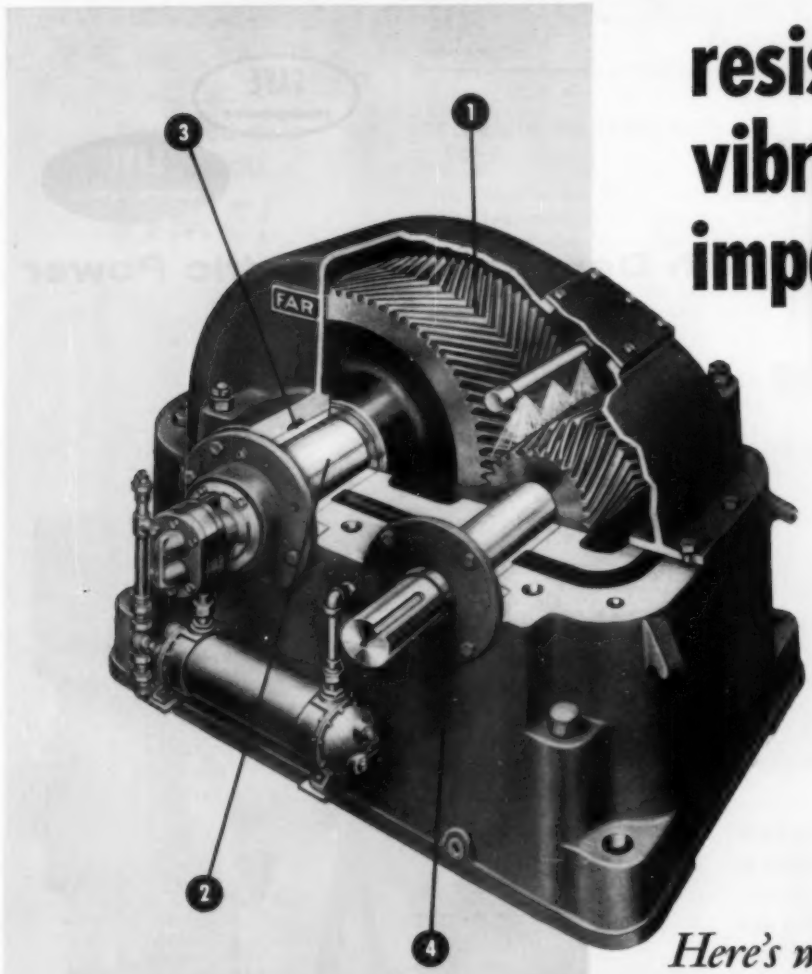
The game of *catalysts* is different from poker, in that it doesn't depend on luck. You've got to have the cards, or you can't make out. Davison *has* the four winning cards to deal you (count 'em!): ♠Experience, based on year-in, year-out production of quality catalysts; ♥Basic research, at our new, thoroughly staffed and equipped Grace Research Center at Clarksville, Md.; ♦Technical assistance when you need it, from a seasoned, competent staff of technical advisers; ♣Quick service from *four* Davison plants conveniently located to deliver catalysts where, and *when*, you need them. So, if you're interested in catalysts, try Davison. They'll deal *you* a winning hand every time!

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
BALTIMORE 3, MARYLAND

Buy DAVISON—the quality catalyst backed up by experience, research, technical assistance, service!

In speed increasers . . . look for

resistance to vibration and impact stresses



Here's why you'll find it when you come to **FARREL**

The problems involved in designing high-speed gearing are quite different from those encountered in ordinary industrial transmissions. Questions of vibration and impact stresses, for example, increase in importance as the speed goes up.

How the design of Farrel SI units has been tailored with these problems in mind, is described briefly at the right. For further details, send for a copy of bulletin 451.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N.Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa, Houston, Fayetteville (N.C.)
European Office: Piazza della Republica 32, Milano, Italy

Farrel-Birmingham

FB-1156

1 **Continuous-tooth herringbone gears** are generated with high precision by the famous Farrel-Sykes process. Gears and pinions are finish-machined on their shafts to insure concentricity of pitch diameters with axes of rotation. Teeth are lapped for a smooth working surface. Rotating elements are balanced for freedom from vibration at high speeds.

2 **Shafts are large** for the power to be transmitted, giving added stiffness against bending and torsional deflections under peak-loading variations. They are ground to a finished diameter with tolerances of plus .000", minus .001".

3 **Oversize bearings** have the capacity to shrug off shock loads. They are the precision-finished sleeve type, split, turned and bored...fitted to bored seats in the housing.

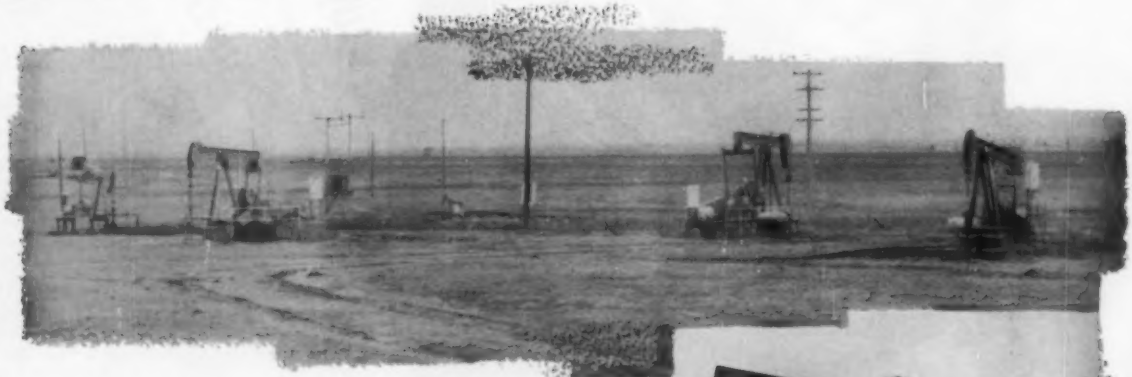
4 **Very sturdy housing** holds rotating elements in original alignment—preserves the operating smoothness of the precision-generated gearing.

SAVE
money

SAVE
manpower

SAVE
maintenance

SAVE with Dependable Electric Power



Typical electric pumping installations

Electrical power gives you economical production when and where you need it. Regardless of the type of pump, locale, climate or other conditions, you will find low-cost purchased electric power more efficient, more flexible. You pay only for the power used — although PEP* works 24 hours a day or operates on any fractional time schedule.

For big savings . . . now is the time to switch to Electric Power. Call the nearest Utility Electric Power Company for full details or write us.

Petroleum Electric Power Association

P.O. BOX 35006, DALLAS 35, TEXAS

*Purchased Electric Power . . .
saves money, manpower, maintenance
and serves you better automatically

WICHTEX
WELL SERVICING UNITS

Designed to
SAVE YOU
TIME!

In well servicing, too, time is money. Wichtex units save you moving time, operating time, maintenance time, and downtime! No contractor is better equipped to give fast, efficient service . . . at a profit . . . than the owner of Wichtex units!

Investigate:

WICHTEX WELL SERVICING UNITS
2,000' to 12,000' capacity
—spudding attachment optional

WICHTEX PORTABLE ROTARY RIGS
2,000' to 5,000' capacity

WICHTEX
MACHINERY COMPANY
P. O. Box 2250
Wichita Falls, Texas

They Say—

For details on propylene

Dear Sir:

We notice in the December 1 issue of The Oil and Gas Journal that the last article in the Newsletter section states "Claim is now discredited that propylene in propane is cause of knocking, burned valves, and other poor operations in engines using LPG as fuel."

In our particular area most of the propane contains propylene and the people who sell natural propane keep telling our customers that the natural is much better.

We would be very interested in getting more information about this. Perhaps you have a complete report or know where we might get it.

Don Sharpe
General Manager
Central Pipe Line Co., Ltd.
Aylmer, Ont.

(Editor's note: T. W. Legatski, Phillips Petroleum Co., will present a paper on this subject at the Society of Automotive Engineers' annual meeting in Detroit, January 12-17. Reprints should be available from SAE).

Troubled waters

Dear Sir:

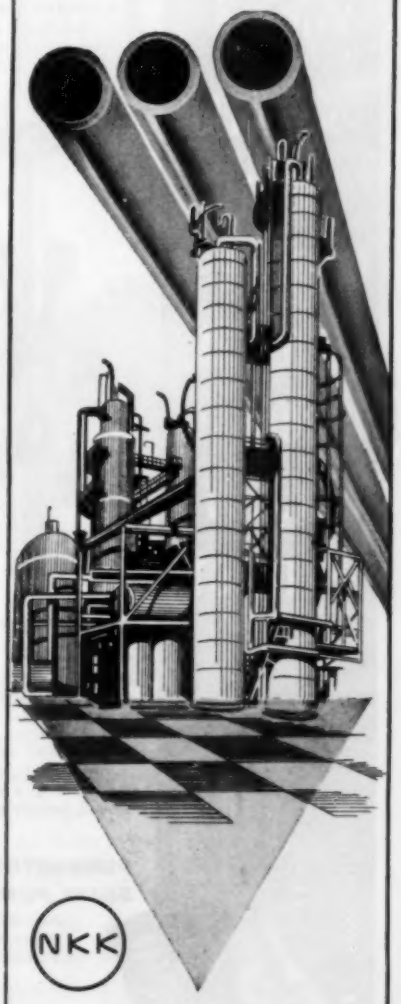
Your article in the November 17 issue about the Minnelusa of the Powder River basin (p. 297) was most timely, informative, and interesting.

However, I am compelled to write about some misleading statements inasmuch as this is at least the second time some have appeared in print. The statement that the "discovery well and later development wells also began cutting a high percentage of water" is ominous sounding indeed, and, moreover, is essentially incorrect.

A number of the Donkey Creek Minnelusa wells do produce water but they also make very substantial amounts of oil. Pennsylvanian and Permian crudes of Wyoming are, for the most part, heavy and viscuous and the Minnelusa crude of Donkey Creek is no exception. Therefore, the physical properties of the crude, combined with a strong water drive and exceptionally permeable sand, make some water production almost unavoidable.

A great many of Wyoming's reserve-rich Tensleep fields have pro-

Pipe & Tube
For Oil & Gas Industries



Foremost producer of steel pipe and tube of all types

NIPPON KOKAN K.K.
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Cable: STEELTUBE TOKYO

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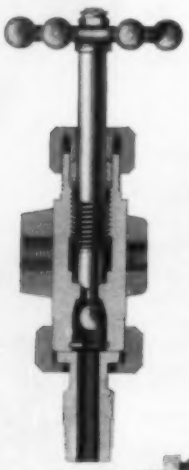
Direct Reading
LIQUID LEVEL GAGES

Designed with exclusive features for range of pressures, temperatures, corrosive conditions or other specific requirements.

- **REFLEX** — 3 pressure groups to 3600 psig. Lengths to 12 ft. Liquid shows black for positive accuracy.
- **TRANSPARENT** — 4 pressure groups to 10,000 psig. Lengths to 12 ft. Clearly shows color, density on media.
- **SPECIAL SERVICE** — High pressure, Frost-Proof, Heating Tube and Chamber, Welding Pad, Large Chambers and Inclined Gages, Explosion-Proof Illuminator.



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GAGE VALVES

Exclusive "floating shank" saves on installation, eliminates strains common to forced installations.

- Threaded Valves for service to 6000 PSI
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- Special Valves and Accessories.

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EJECTORS

Hydraulic, air and steam operated Penberthy ejectors (jet pumps, eductors, exhausters and syphons) simplify handling of fluids, vapors, gases and "hot" materials. In a variety of standard and special designs and materials.

PENBERTHY
SUMP PUMPS

Automatic, electric, explosion-proof, submersible and standard types in 8 models, 20 sizes.

Your request for literature or specific engineering data, for any or all Penberthy products, will receive prompt, personal attention.

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There's Certain Satisfaction in **PRODUCTS BY** PENBERTHY

- EJECTORS
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- SUMP PUMPS

duced water with the oil from the date of completion. The words "trouble" and "water" are not synonymous. Water cuts in the Minnelusa wells stabilize and there is every evidence that the wells will produce for many years. Donkey Creek has produced more than 500,000 bbl. of Minnelusa oil under restricted production and is just nearing full development.

It is, in short, a healthy, profitable Minnelusa field. Your information, of course, comes from the AAPG Bulletin which you list as a reference. It is regrettable that the source article contained erroneous data.

I must also take exception to your statement that the future pre-Cretaceous fields will be "by and large" stratigraphic accumulations. There will, of course, be stratigraphic fields, but at this stage of exploration we don't even have a starting point on strat plays because of extremely limited control.

On the other hand, Minnelusa exploration now involves a search for structure. The Donkey Creek Minnelusa pool is primarily a structural accumulation. The same is suspected of Pan American's Robinson Ranch discovery. True Oil Co.'s Timber Creek discovery was a structural play.

Please accept this letter as a friendly attempt to supply accurate information. I believe that any implication, even though unintended, that Minnelusa production is substandard is an injustice to those operators who pioneered Minnelusa exploration.

W. E. West, Jr.
Consulting Geologist
Casper, Wyo.

(Editor's note: Reader West is, of course, correct in his assumption that much of the material mentioned came from AAPG sources. This enlargement of the oil-water situation is a welcome addition to our knowledge of Powder River-Minnelusa production.)

Efforts not coordinated

"There should be better coordination of the foreign activities of the various U. S. Government agencies, requiring all of them to support fully the national policy of this country of encouraging private investment abroad.

"At present, at the same time the President and most government agencies are encouraging private foreign investment, the Department of Justice seems to be embarked upon a program of attacking foreign activities of American enterprises

"What is past is prologue"

The fifty years behind us embrace an exciting, outstanding era in the development of the oil and gas industry. New, almost unbelievable, technology has revolutionized every phase of our industry.

As we commemorate our Golden Anniversary at Southern Engine & Pump Company, we are proud of being a part of the parade of progress that has meant so much to the Gulf Coast area. Our celebration is actually an observance of gratitude for the experience gained from those eventful years. This experience, rather than signifying a complacent fulfillment, has prepared us for even greater service to the industry that has made our growth and development possible.

Our aim today — as it was a half century ago — is to continue serving our customers with the finest products and service available. Truly, here at Southern Engine & Pump Company, the "past is prologue."

SOUTHERN ENGINE & PUMP COMPANY

MANUFACTURERS · MACHINERY FACTORS · CONTRACTORS

HOUSTON · DALLAS · SAN ANTONIO · EDINBURG · KILGORE · BEAUMONT

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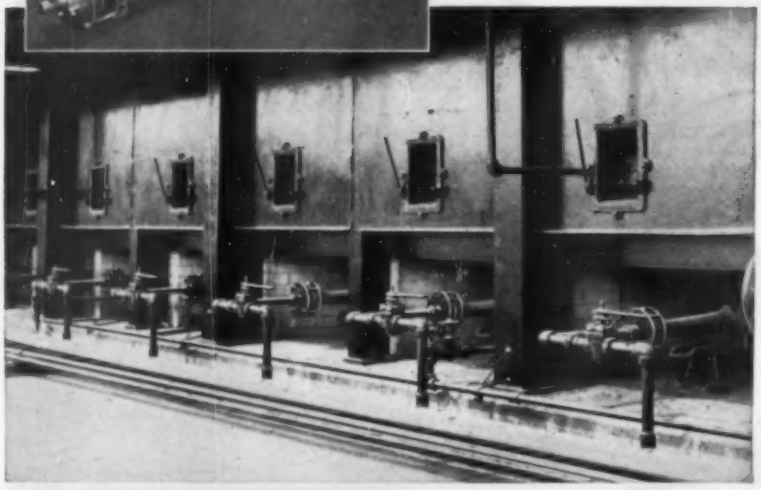
Gas Firing
FOR CENTER WALL UP DRAFT HEATERS



NATIONAL AIROIL

AIROCOOL Gas Burners

National Airoil Burner Company's well known AIROCOOL Gas Burners have been widely accepted to efficiently up-fire all makes of center wall up-draft furnaces—heaters for various processes in numerous petroleum refiners extending around the world.

These venturi inspirating gas burners can be furnished with either single or twin nozzles to meet the customary flame-capacity performance.

National Airoil's exclusive AIROCOOL nozzles, figure #507 shown in the above burner photo, are supplied for high to medium molecular weight gases including natural gas.

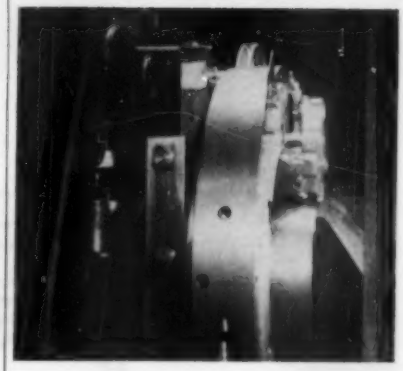
Another popular advanced type is our HYDRO-COOL nozzle—not shown—which is universally used for hydrogen and other lower molecular weight gases that are prone to "flash back."

Regardless of the design of heater-furnace combination we have the correct gas or oil burner to fire it.

National Airoil
BURNER COMPANY, INC.

Main Office & Factory: **1236 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.**

SOUTHWESTERN DIVISION 2512 SOUTH BOULEVARD, HOUSTON 6, TEXAS



...Refinish Crank-Pins ...In Place!

● Accurate High Quality Maintenance And Machine Work

The small engine crank pictured above was restored in close quarters without dismantling engine. Our portable machines can solve your problems and save you money. Crank pins from 5½" through 20" in diameter accurately refinished in place at great saving in cost. Let us help you minimize down time.

Worn and damaged flywheel fits refinished in place.

In our shop crankshafts of any size or type completely refinished. Shafts straightened and broken shafts successfully repaired.

Most modern methods used in rebabbitting and machining engine and turbine bearings.

All types of heavy power plant equipment serviced with special attention given to emergency repairs.

Additional information furnished without obligation.

WASHINGTON
IRON WORKS, INC.
SHERMAN, TEXAS
Established 1876

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which have made substantial investments abroad."

M. J. Epley, Jr., vice president and assistant to the chairman of the board, The Texas Co., in a statement to the subcommittee on foreign trade policy of the House Ways and Means Committee.

Letters to They Say should be addressed to The Editor, The Oil and Gas Journal, Box 1260, Tulsa, Okla.

CALENDAR

JANUARY

12-14 Pipe Line Contractors Association, eleventh annual convention, Americana Hotel, Miami Beach, Fla.

12-16 Society of Automotive Engineers, annual meeting and engineering display, Sheraton-Cadillac and Statler hotels, Detroit.

16-17 Association of Oilwell Servicing Contractors, annual meeting, Baker Hotel, Dallas.

21-22 Western Petroleum Refiners Association, Gulf Coast regional technical-industrial relations meeting, Ben Milam Hotel, Houston.

22-23 National Association of Corrosion Engineers, Houston section, annual short course, University of Houston campus, Houston.

22-23 American Chemical Society, Southeastern Texas section, third biennial symposium on hydrocarbon chemistry, Shamrock Hilton Hotel, Houston.

22-24 Texas Society of Professional Engineers, annual convention, Shamrock Hilton Hotel, Houston.

23 Natural Gasoline Association of America, Oklahoma regional meeting, Biltmore Hotel, Oklahoma City.

26-29 Tenth annual plant maintenance and engineering conference, sponsored by Clapp & Poliak, Inc., Public Auditorium, Cleveland.

28-29 Annual Midwest Welding conference, sponsored by Armour Research Foundation of Illinois Institute of Technology, and American Welding Society, Chicago section, Illinois Institute of Technology, Chicago.

30-31 Oklahoma Society of Professional Engineers, annual meeting, Mayo Hotel, Tulsa.

FEBRUARY

1-4 American Association of Petroleum Geologists, Rocky Mountain section, ninth annual meeting, Civic Auditorium, Albuquerque, N. M.

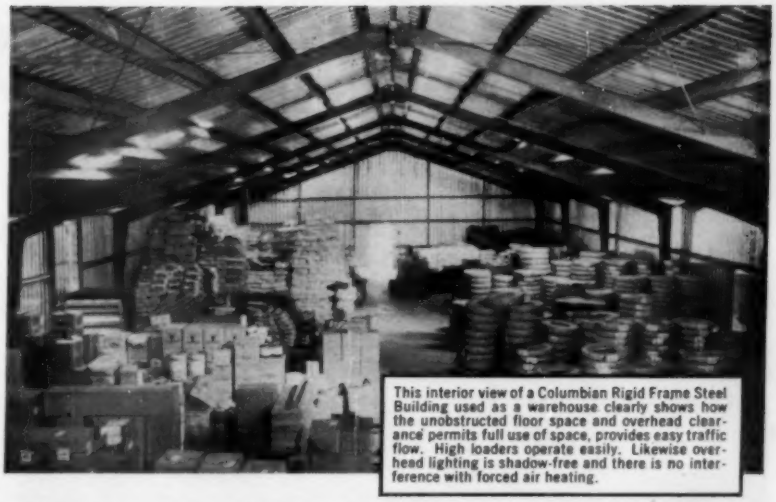
1-6 American Society for Testing Materials, D-2 committee on petroleum products and lubricants, Sheraton-Jefferson Hotel, St. Louis.

2-22 Southwestern Legal Foundation, course on oil and gas law, Southwestern Legal Center, Dallas.

11-13 Southwestern Legal Foundation, tenth annual institute on the law of oil, gas, and taxation, Southwestern Legal Center, Dallas.

11-13 National Association of Corrosion Engineers, Tulsa section, tenth annual pipeline corrosion short course, Mayo Hotel, Tulsa.

15-19 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual meeting, Sir Francis Drake Hotel, San Francisco.



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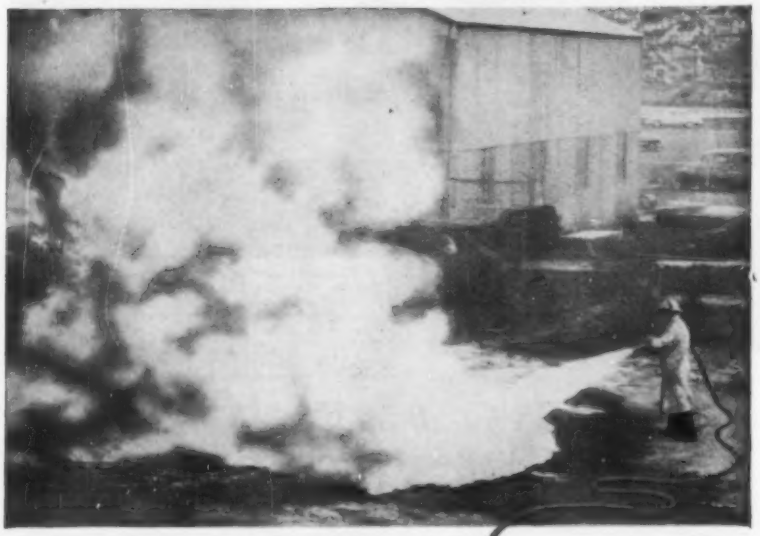

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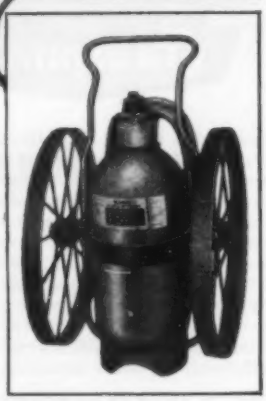

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16-18 American Management Association, seminar on management problems of exploration and production, Hotel Astor, New York.

24-25 University of Oklahoma, sixth geological symposium, Norman, Okla.

27 Natural Gasoline Association of America, Permian basin regional meeting, Scharbauer Hotel, Midland, Tex.

26-28 Pipe Line Contractors Association of Canada, fifth annual convention, Castle Harbour Hotel, Bermuda.

MARCH

3 Petroleum Equipment Suppliers Association, Pacific district, annual membership meeting, Ambassador Hotel, Los Angeles.

9-11 Midwest Gas Association, annual meeting, Hotel Fort Des Moines, Des Moines.

11 Petroleum Equipment Suppliers Association, southwestern district, annual membership meeting, Shamrock Hilton Hotel, Houston.

13 American Institute of Chemical Engineers, Sabine area section; American Chemical Society, Texas-Louisiana Gulf section; sixth annual joint technical meeting, Lamar State College of Technology, Beaumont, Tex.

16-18 Western Petroleum Refiners Association, forty-seventh annual meeting, Hilton Hotel, San Antonio, Tex.

17-18 Manufacturing Chemists' Association, air and water-pollution abatement conference, Netherlands Hilton Hotel, Cincinnati.

18 Petroleum Equipment Suppliers Association, eastern district, annual membership meeting, Duquesne Club, Pittsburgh.

16-19 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, forty-fourth annual meeting, Memorial Auditorium, Dallas.

19-20 New England Gas Association, annual meeting, Hotel Statler, Boston.

25-27 American Petroleum Institute, Division of Production, southern district meeting, Roosevelt Hotel, New Orleans.

APRIL

2-3 Society of Petroleum Engineers of AIME, Rocky Mountain petroleum section, Casper, Wyo.

2-3 American Institute of Mining, Metallurgical, and Petroleum Engineers, technical conference on stress corrosion, Mellon Institute, Pittsburgh.

6-7 Instrument Society of America, second national symposium on chemical and petroleum instrumentation, St. Louis.

5-10 American Society of Mechanical Engineers, nuclear congress, Cleveland Auditorium, Cleveland.

8-10 American Petroleum Institute, Division of Production, eastern district meeting, Penn-Sheraton Hotel, Pittsburgh.

14 Independent Oil Men's Association of New England, annual meeting, Hotel Statler, Boston.

14-16 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.

15-17 National Petroleum Association, semi-annual meeting, Hotel Cleveland, Cleveland.

15-17 American Petroleum Institute, Division of Transportation, annual tanker conference, Jung Hotel, New Orleans.

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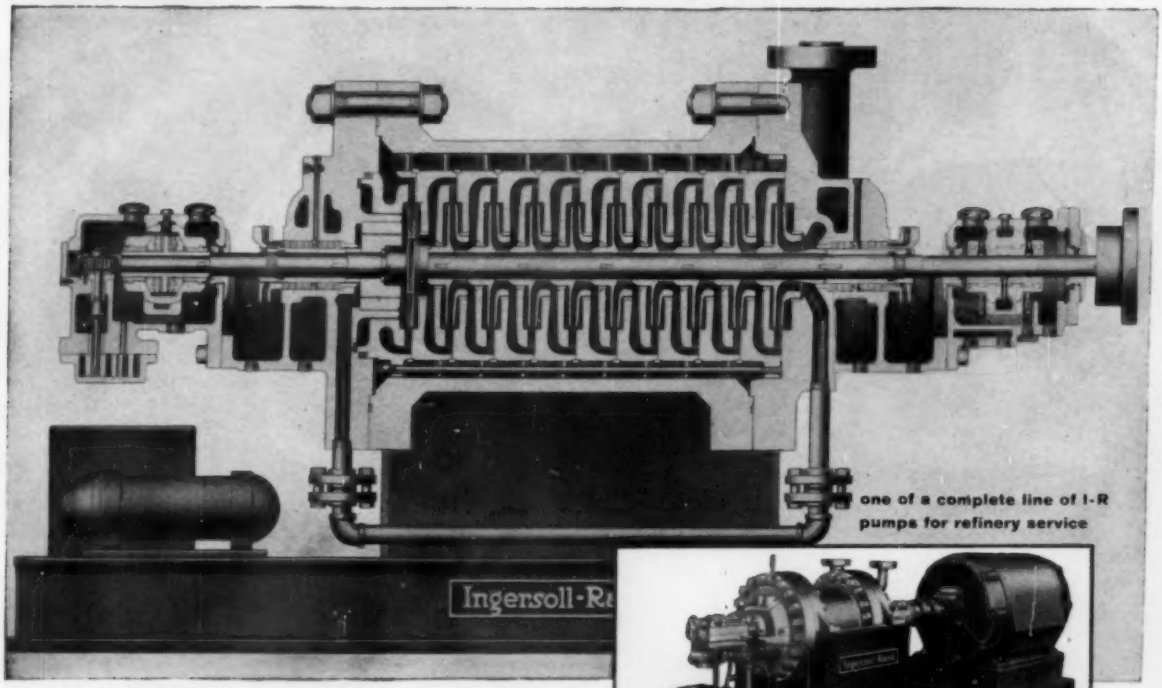
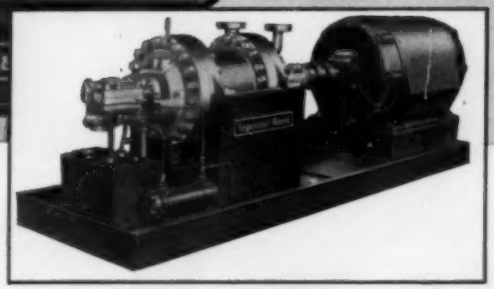


one of a complete line of I-R pumps for refinery service



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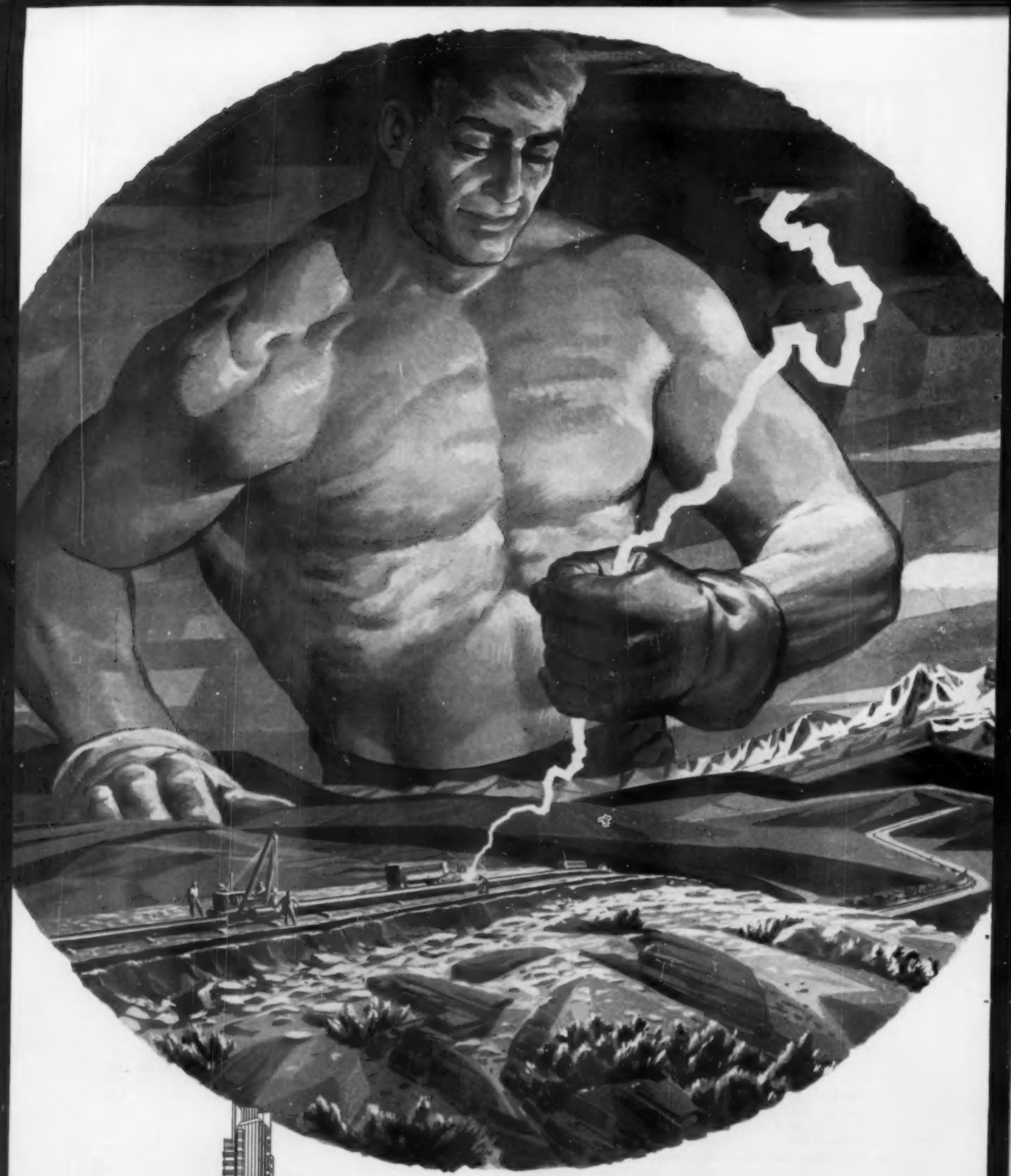

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JOURNALLY SPEAKING

"Junior" Statisticians Report

ONCE A YEAR the foreign department of the Big Yellow Book winces a little guiltily about times past when we've unlimbered the old wheezes about "figgers don't lie, but . . . etc." This is the period just past when we take on the role of a junior John Casper and play our annual numbers game. It's not a familiar role for those of us who have trouble making the bank balance check and things like that, but like it or not, for a few weeks each year we become statisticians.

The results you'll find beginning on page 87. Like any fond parent we're rather proud of our new baby, the annual World-Wide Report on producing fields and refineries. This one has godfathers scattered literally over the face of the globe.

Putting together the numbers that make up complete tables and listings of wells, fields, refineries, and process units would be virtually impossible without the excellent cooperation we get from governments, companies, and hundreds of individuals all over the world. To each and every one of these, we doff our editorial hat and send off a resounding, "Thanks."

The emphasis this year is even more on numbers than ever before. Our theory is that these tables contain the basic and pertinent data for the entire free world. The presentation editors have packaged the material up in what we fondly hope is something easy to follow and digest. Any Journal reader looking for any specific fact about any refinery or field anywhere in the world should be able to turn to it with only a slight effort.

Just to show how infectious this numbers game is—we're beginning to understand more and more how economists and statisticians get that way—we've almost come to the heretical conclusion that figures are more important than the deathless prose which accompanies them. But, then, we're still a little punchy because for the last 60 days or more we've looked at little else than numbers.

Each year since the Journal first started this project, the figures are more complete. This year is no exception. It is a refinement of the last survey. We expect next year's to be even better.

This year there are only a very few spots where estimations were necessary. These weak links in the solid chain of data are getting fewer each year. That's the way we like it.

Just as much tender loving care (well, almost) went into the production table of tiny Taiwan (Formosa) with its 6 fields, 57 producing wells, and 39 bbl. daily production as was put into big, husky Venezuela. The theory is that Taiwan may not be important oil country, but as long as it clings to that 39 bbl. daily and keeps hopefully punching holes, it's still oil country and should be included.

The one remaining gap . . . Like everyone else, in the past we've had to be content with the information which the Iron Curtain countries chose to release in connection with their oil industries. In recent months, Khrushchev and associates have been given to more than a little boasting about oil in Russia and the satellites. Some of the announced "goals" for oil production and refining for these communist countries have been a little startling. We thought it only fair to give them a chance to back these up with a few facts and numbers.

With the idea we had nothing to lose but the postage, each of these countries was sent the same questionaires we mail to every private or government-owned oil company in the free world.

The project wasn't exactly a howling success. But, every little bit helps—even a reply that says nothing. Here's what we got:

From Czechoslovakia — "Since the production of this industry (oil) is relatively insignificant in our country—108 thousands of the crude oil and 654 thousand tons of motor petrol in 1957—the State Statistical Office has no detailed records of the data you need.

"Looking forward to our further cooperation."

From Hungary—"At your request may I inform you that the crude-oil production of Hungary amounted to 387,000 tons in the first half of 1958. Detailed data on oil production and oil refining are not available."

From Poland—"We inform you that owing to a lack of related statistical materials, we are not able to furnish you with information mentioned in your letter."

From Russia, Albania, Romania, and Bulgaria—Nothing.

Oh well, maybe next year.

—Paul Swain

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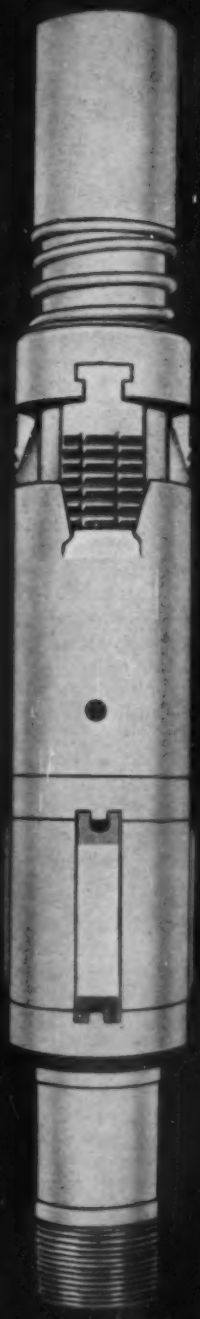

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World oil policies seem paradoxical

SELDOM in the past decade has the international oil situation been so full of paradoxes as it is at the present.

A great deal of the world is acting as though it puts implicit faith in the forecasts of various economists who predict that the world's demand for energy will increase so rapidly that there will soon be a global oil shortage.

If taken literally, such prognostications might justify importing nations in hastening to sew up rights to foreign supplies securely and at almost any cost. They might justify exporting nations in demanding extravagant favors in return for their oil.

BUT A REALISTIC APPRAISAL of the current situation makes it apparent that a world scarcity of oil cannot possibly come about for a good many years, at least, barring another world war.

Every oil-exporting country, plus several that import to some extent, has excess producing capacity right now. Moreover, most of them have the potential for still more and have their sights set on expansion.

The world surplus of crude oil is so great that a country the size of Iraq or Indonesia could drop out of the world market and not be missed after a few weeks of rearranging tanker routes. Several areas in the Middle East and the Americas could greatly increase the volume of oil put onto the world market almost overnight.

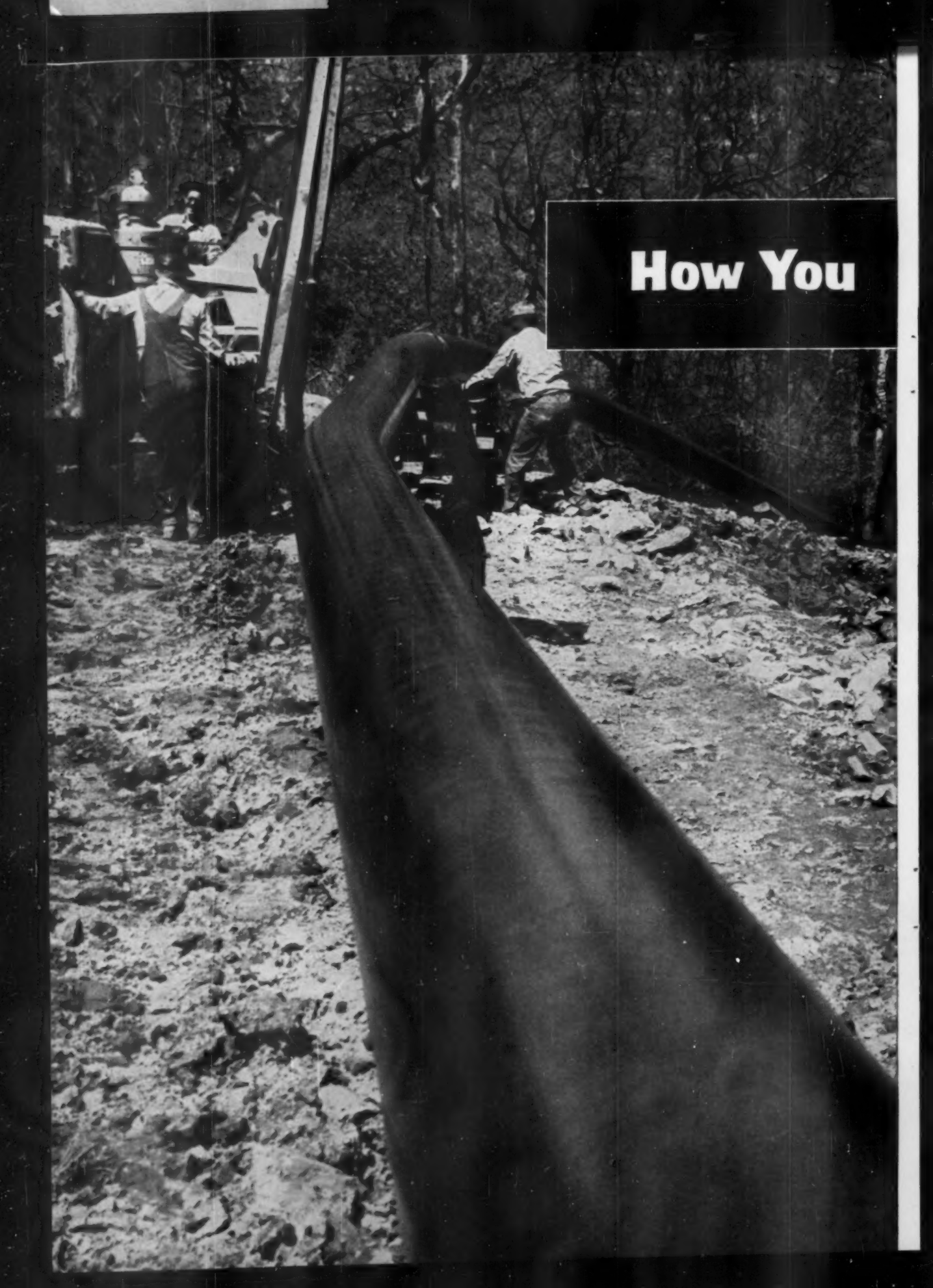
Africa is still the Dark Continent so far as oil exploration is concerned, but the tempo of the search there is increasing rapidly. Recent discoveries in the Sahara and elsewhere suggest that Africa may be a huge exporter within a few years.

And in the vast stretches of the U.S.S.R. and Red China many new oil fields have been brought in recently. Russian oil is already a factor in world commerce, and could become a flood.

WITH SUCH A SITUATION prevailing, producing nations would be well advised to pitch their policies on the prospect that a buyers' market will continue for quite some time. This means that the lowest-cost oil will capture whatever of the world's markets are open to imports.

This is hardly the time to get into an international race to bid up the cost of export oil by higher taxes, profit splits, concession terms, or similar devices.

An individual exporting nation that boosts its costs above its competitors will soon find its sales dwindling. And if the world price rises it will only encourage countries like Argentina, France, and the United States to take further steps toward self-sufficiency.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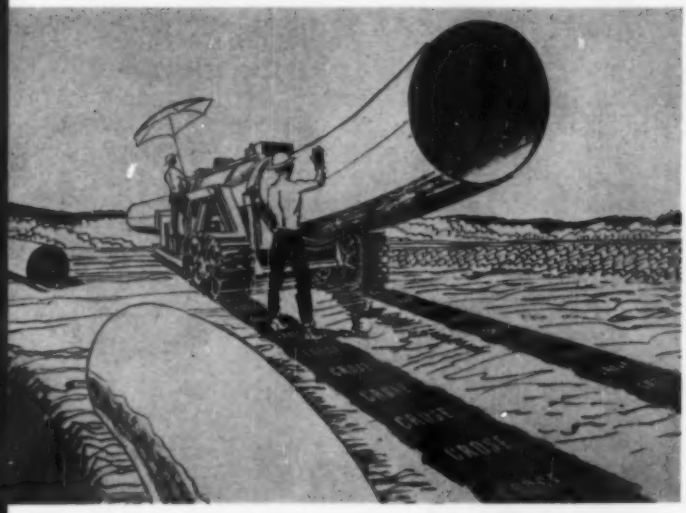

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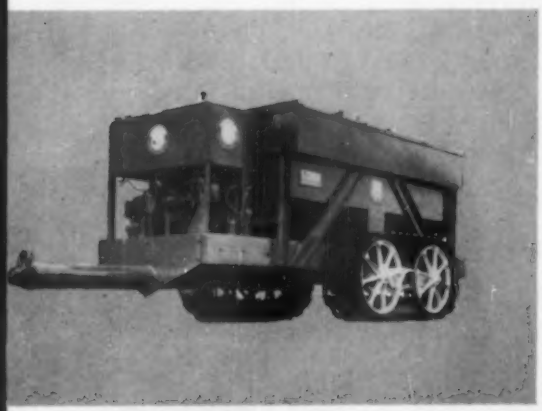

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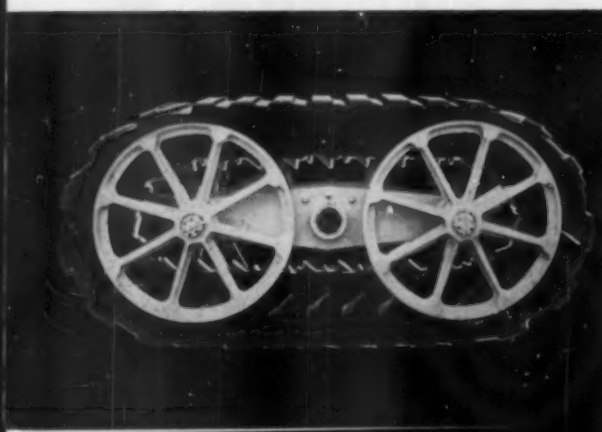

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New Oil Laws Are Talked in Rockies

• Additional taxes loom in Colorado and other states; conservation measures on tap for Nebraska, Utah.

STATE legislatures start convening early in January, and from then until spring it's open season for legislation affecting the oil industry.

Oil men this year have their eyes focused on lawmakers in the Rocky Mountain region.

This area is fast coming of age as an oil province and is facing up to problems encountered already by older oil areas. How they are solved will provide interesting developments in the months ahead.

The big problems . . . Two chief areas of legislation this year for Rocky Mountain lawmakers will be: Taxes and conservation.

Political observers throughout the west say "this is the year for taxes." None professes to know what levies will be passed before the legislators finally go home. But all agree that nearly every state will be looking for more revenue—and business, including oil, provides a likely target.

The tax story is nothing new to the oil industry. Politicians seem never to have enough money. Inflationary trends of the last few years have added to their headaches in finding enough revenue to pay salaries, underwrite new projects, and maintain state governmental services.

Presession capital talk in western states this year affecting the oil industry has mentioned higher income taxes, new gross production or severance levies, higher lease rentals, or tougher ad valorem taxes.

On the matter of conservation, oil men report there appears to be a new awakening in the Rockies that prevention of waste, protection of correlative rights, and stricter field rules may hold an economic advantage to the state as well as oil producers.

As a result, the problems of gas flaring, ratable take, proration, wider spacing, and unitization may appear in deliberations of legislative committees or find their way into bills that become law.

Preview of Rocky Mountain Legislatures

	Opening date	Session limit	The issues
ARIZONA	Jan. 12	60	New oil-gas commission
COLORADO	Jan. 7	None	Taxes, leasing rules
MONTANA	Jan. 5	60	Taxes, leasing tenure
NEBRASKA	Jan. 6	None	Conservation, lease rentals
NEW MEXICO	Jan. 13	None	No big issues in sight
NORTH DAKOTA	Jan. 6	60	No big issues in sight
SOUTH DAKOTA	Jan. 6	60	No big issues in sight
UTAH	Jan. 12	60	Taxes, new leasing rules, correlative rights, ratable take
WYOMING	Jan. 13	40	Severance tax possible

At this stage, it appears that Utah, Nebraska, and Colorado will have the biggest volume of legislation concerning oil. But oil matters also are due to come up in Wyoming, Montana, Arizona, and New Mexico.

The Utah picture . . . There's little doubt that the Utah lawmakers will pass some oil legislation during the coming session.

The shutdown in the Aneth area has spotlighted the state's lack of strong oil statutes. At this stage, discussions have revolved around bills proposing a new state oil and gas leasing act, higher taxes, ratable take, and measures to protect correlative rights.

The leasing act may be the most far reaching. Some state officials strongly believe that Utah can increase its revenue from oil and gas with a new law setting up competitive bidding for leases and increasing royalties on state lands.

Since this increased revenue would come from oil men's pockets, the industry will oppose many of the provisions. A committee of the Rocky Mountain Oil & Gas Association has met for months with Utah Legislative Council members trying to work out a compromise that the oil industry can live with and that will not cripple future exploration in the state.

Some of the latest proposals include: A sliding-scale royalty on leases near production ranging from 12½% to 16⅔% for gas and 12½% to 25% for crude oil. Rentals on all leases would be $1 per acre per year.

The RMOGA committee in Utah is trying to reduce the sliding-scale royalty, eliminate competitive bidding on previously leased lands, keep primary term of leases at 10 years, eliminate or raise acreage limitations, and keep the rental rate at 50 cents per acre.

Utah officials also are looking for additional tax revenue. A bill may be introduced to increase the mining occupation tax from 1% of gross revenue to 2%. The oil industry is subject to this tax. Another proposal being considered is the possibility of raising the state sales tax by one-half cent. Otherwise, the oil industry is expected to escape any severe new taxes.

Some oil operators in Utah are pushing for legislation to impose ratable take and protection of correlative rights. The Aneth situation may give urgency to this move.

Market-demand proration, however,

definitely will not be pushed. In some quarters, it is highly unpopular. Those who favor market-demand proration feel submitting such legislation now might wreck plans for any other type of conservation measure.

Nebraska outlook . . . Chief proposal coming before the Nebraska legislature is creation of a conservation commission.

Similar moves were defeated in 1955 and 1957. An interim committee has drafted the new approach which reduces size of the proposed commission to three members and leaves other matters pertaining to the commission up to the legislature.

The bill creating the commission also will be a conservation measure, providing MER's for production to prevent waste. It is modeled after the Interstate Oil Compact Commission's suggested bill. The proposal will not provide for market-demand proration nor compulsory unitization, but will allow the commission to determine well spacing.

Normally, creation of a new bureau is unpopular in Nebraska. But the conservation measure is expected to get the active support of the legislative council which will proclaim the need for a conservation law.

Other bills reportedly are being prepared dealing with rentals on state-land leases and with bonus provisions of state school-land leases.

Annual rental now on Nebraska state-land leases is equal to the sum paid for the bonus. For example, if $50 an acre is paid as a bonus, then $50 an acre is the rental rate. The proposed bill, if adopted, would reduce the rental to the more realistic practices followed in the industry, or 50 cents an acre.

Another proposal in the mill would provide for a bonus bid on state school-land leases. These leases currently are auctioned on an annual delay-rental bid exclusively. The proposed bill would stabilize the annual delay rental at 50 cents an acre and provide for a bonus bid. The person bidding the most bonus naturally will get the tract on auction for a 10-year lease.

Otherwise, no new tax measures specifically involving the oil are expected during the Nebraska session.

Colorado . . . Gov. Stephen L. R. McNichols may have some tax legislation cooking for the oil industry.

He has not revealed publicly just what he will propose to the Colorado legislature. But this much is known:

A special tax committee, appointed by the governor, has made a study of ways to increase state revenues. The committee reportedly came up with a list of 20 industries that can be taxed more heavily. And oil is one of the 20.

What this will mean is still only a guess. McNichols recently was re-elected, which makes him wield a big stick.

The committee also recommended that the governor ask the legislature to submit a constitutional amendment to the electorate to establish validity of the present gross production tax. The present tax imposed by the legislature is being challenged before the Colorado Supreme Court. The state, as a result, faces the possibility of having to refund $20 million collected and spent since 1953.

An effort may be made in Colorado to change some of the provisions for leasing state land. A person desiring to lease state lands now is required to submit a sealed bid of not less than $5 per acre. If no sealed bids are submitted, the land is offered at public auction. An effort will be made to raise the minimum for sealed bids to $10 an acre. Purpose is to force sale of more lands at auction.

Oil men themselves will propose an increase in mill levy on production to finance the administrative costs of the Colorado Oil and Gas Commission. Funds provided by the present law have become inadequate due to a drop in Colorado production. New levy will not exceed 1.33 mills on value of production.

Montana . . . A shortage of state funds in Montana is sounding the warning signal on new taxes.

The Montana Taxation - Education Commission has estimated the legislature must raise an additional $25 million a year just to maintain the present level of governmental services.

The commission is recommending a new type of state income tax designed to raise an additional $11 or $12 million, instead of a general sales tax. The rate would be 1½% of net income and would apply to dividends paid to persons outside the state on corporate business done in Montana.

This novel feature would work like this: If 10% of the corporation's business is done within Montana, then 10% of the dividend would be taxable as income earned in the state.

Another unusual approach is a proposal being made that a nonresident income tax be levied on royalties and rentals earned from property in Montana.

The Montana commission also recommended that the state board of equalization should be instructed to prepare a fair and equitable corporation income - tax law. It further urged a long-range study whether the present tax on net proceeds in lieu of property tax on minerals in place meets the best interests of conservation and revenue needs in Montana.

Only other oil legislation being discussed is a proposal that Montana should exchange present 20-year state leases for permanent leases.

Wyoming . . . The Wyoming legislature may provide the bright spot of Rocky Mountain lawmakers.

New taxes against the oil industry are doubtful. Even if passed by the legislature, extra taxes likely would be vetoed by Governor - elect Joe Hickey.

Hickey has declared that Wyoming's future development depends on taxes not being increased. He said he saw no need for more taxes even if there were difficult state problems to solve.

A right-to-work bill is expected to be introduced in the coming Wyoming session. But the oil industry does not plan to take a position on the bill or engage openly in the fight expected.

Oil men don't discount the possibility that a severance-tax proposal may come up again in the Wyoming session. They think it will be only a token effort, however, because severance-tax bills were defeated in the 1955 and 1957 sessions.

In place of a severance tax, Wyoming taxes minerals as personal property at 100% of value. Oil industry also pays about one-third of the state's ad valorem taxes.

In other western states, New Mexico, Arizona, North and South Dakota, only minor legislation, if any, is expected. Arizona lawmakers, however, may consider setting up a separate oil and gas commission. This work is now performed as a part of the Land Commissioner's office.

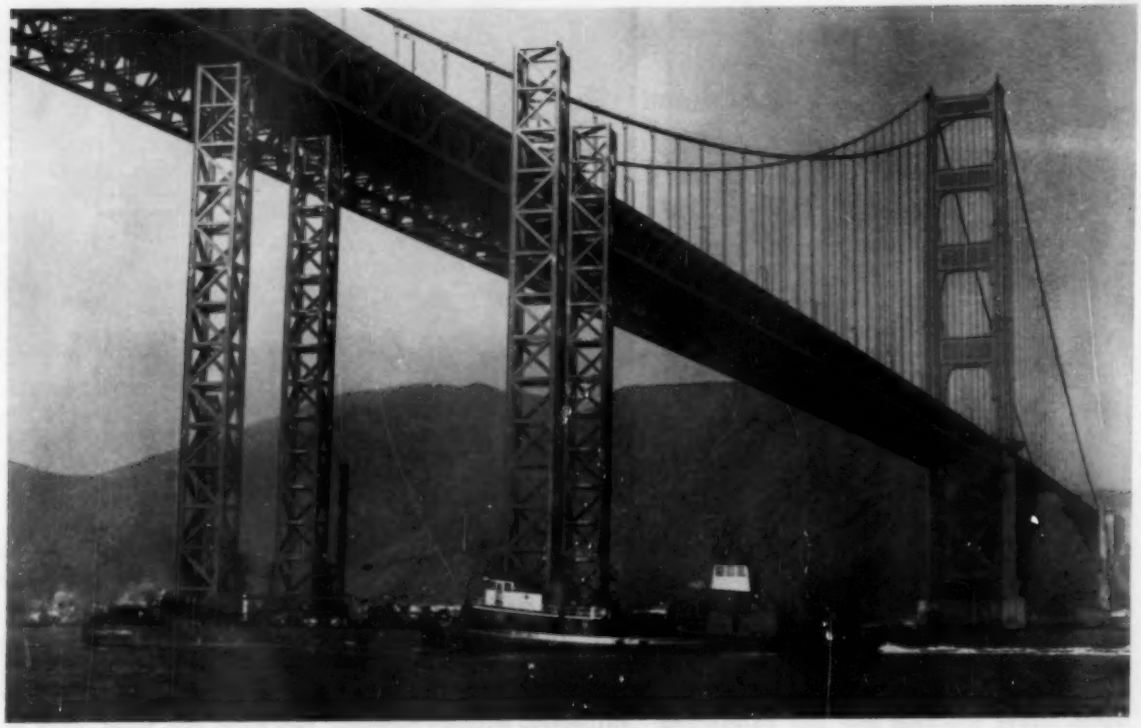
For our subscribers:

A Journal Bonus

IT'S BARGAIN time again, and here's one that can't be beat—absolutely free. It's The Oil and Gas Journal's annual index of stories which appeared in the magazine during 1958.

It has become a valuable book over the years for readers as a quick reference to articles printed in the Journal.

Copies of the index are free to Journal subscribers. Just drop a postcard request to The Reader Service Department, The Oil and Gas Journal, Box 1260, Tulsa, Okla. The index will be mailed just as soon as it's printed in early January.



SQUEEZING under the Golden Gate bridge is the "George F. Ferris."

King-Sized Platform Goes to Work

• Big mobile unit will help lay sewer line off California that is 12 ft. in diameter, then be converted for drilling. Legs on unit are 275 ft. long.

THE WORLD'S largest mobile offshore platform arrived off El Segundo in Santa Monica Bay last week. But it will be at least a year before the oil industry gets to use it.

First order of business will be to help build the largest, heaviest, and longest pipeline ever pieced together under water. This impressive project is a $20 million sewer effluent line to be built for the city of Los Angeles.

The record-size DeLong platform, the "George F. Ferris," was built in San Francisco. In starting its 400-mile sea voyage to Los Angeles, it performed the feat of ducking under the Golden Gate bridge.

To do it, the 275-ft. high legs were jacked to full height, while the rig was towed through shallow waters of the bay to the bridge. When it entered the Gate straits, the legs were lowered 57 ft. to allow it to go under the 232-ft. high bridge.

After it went under, the legs were raised immediately to clear a sand bar. When it cleared this obstacle, the legs were lowered 37½ ft. to provide navigational stability.

This maneuvering had to wait until the weatherman could predict at least a week of clear weather. A high tide was necessary to float the rig away from the dock and over the sand bar. A strong incoming current was required to slow the platform enough so it could raise its legs in the short run between the bridge and sand bar.

King-size . . . The barge is huge. The four legs are 275 ft. tall by 16 ft. square. The platform is 190 ft. long by 122 ft. wide by 17 ft. deep.

Without any equipment, it weighs 4,500 tons. For the pipe-laying job, it will add bins for 1,500 tons of gravel and a 100-ton crawler crane.

When it is converted to oil drilling, the gravel bins can be removed leaving a center well for drilling.

Its first job . . . The pipe-laying project will be equally spectacular. It involves laying 32,000 ft. of 12 ft. diameter cement pipe in water depths to 200 ft. The pipe weighs nearly 4 tons per foot.

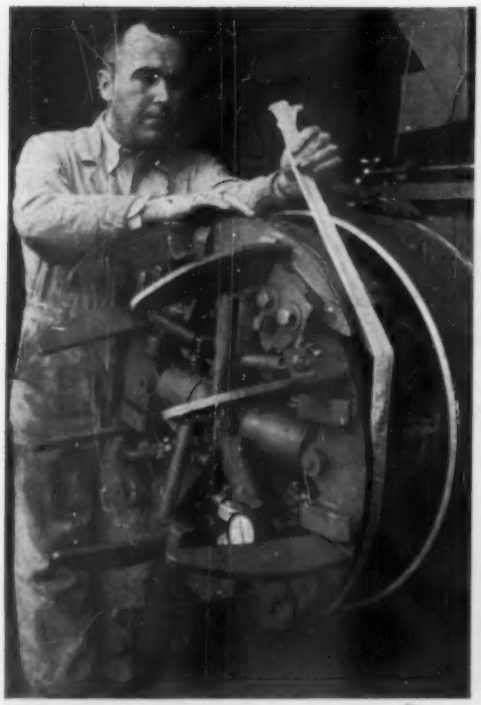
The pipe will be assembled at Long Beach harbor in 192-ft. sections aboard a smaller DeLong platform. When a section is made up, the platform will be lowered and a pontoon floated over it.

Then the platform, pipe, and pontoon will be raised and the pipe and pontoon strapped together. The deck again will be lowered and the pontoon with its pipe-cargo floats off.

A tug will tow the pontoon and pipe 20 miles to El Segundo, maneuver it under the big platform where the section will be lowered to the ocean floor.

By using closed circuit TV, the pipe can be accurately spotted for connection with the line already in place. Through a crane-operated tube, gravel will be poured around completed sections of the line.

The work is under the direction of Hyperion Constructors, owners of the platforms. It is a joint venture with Raymond International, Inc., DeLong Corp., Healy-Tibbitts Construction Co., Peter Kiewit Sons' Co., Macco Corp., and Tavares Construction Co.



GLASS SLEEVE is slipped over new backup ring developed by H. C. Price Co. for . . .

AUTOMATIC WELDING technique, here being shop tested, which requires only two beads for a completed weld.

Double Jointing to Be Done on Right-of-Way

Paul Reed
Pipeline Editor

DOUBLE JOINTING of pipe by automatic welding has proven its ability to speed up operations of a pipeline-construction spread and thus cut costs.

But conditions don't always permit operation of a double-jointing yard. This is especially true where hauling 80-ft. joints, rather than single 40-ft. joints, from a yard to the right-of-way is prevented by highway legal restrictions, or poor roads themselves.

So it becomes desirable to develop a type of double-jointing plant especially for the right-of-way. How to accomplish this has challenged pipeliners ever since submerged-arc welding first came into pipeline double jointing 10 years ago.

As a fresh start toward this goal, H. C. Price Co., Bartlesville, Okla., is developing a new automatic-welding technique using the submerged-arc process. It incorporates a copper backup ring protected by a special woven-glass sleeve.

The ring mounted on the internal lineup clamp makes it possible to run a root bead automatically as the first bead on the outside of the pipe. The technique requires only two beads—both applied on the outside of the pipe. A convenient method of running the root bead automatically has baffled welding experts.

Backup ring significance . . . The backup ring technique makes it possible to supplant two previous root-bead procedures used in different kinds of double jointing with submerged-arc welding:

. . . It eliminates the need for running the root bead as an initial stringer bead by manual electric-arc welding prior to running two beads by submerged-arc welding.

. . . It makes it possible to avoid running the root bead from a gantry boom inside the pipe as the third bead in the Price-O-Matic method of welding (O&GJ, April 22, 1957, p. 104, and Dec. 16, 1957, p. 82). Eliminating this step is considered essential for double jointing under right-of-way conditions. The Price-O-Matic method is a 100% submerged arc method requiring three beads.

The copper ring-glass sleeve method is regarded by Don Barchus (left photo) and Barney Elliott (at left in right photo), welding technologists for H. C. Price, as vital for submerged-arc welding for double jointing on the right-of-way.

But it's not advantageous as a substitute for the inside weld made by Price-O-Matic in yard-type operations.

The new technique has been tested in making 150 welds on 30-in. diameter 0.375-in. wall pipe, rotated by power-driven rollers. Welding is done by a conventional submerged-arc welding head.

Right-of-way operations . . . To double joints on the right-of-way, pipe would be stacked in advance at convenient intervals on ground which is level enough for operation of the portable plant.

The plant would be dismantled and set up at new locations as required. From the plant double joints would be strung along the right-of-way. The longer joints could be handled in rough and hilly country, according to the Price company. One problem still under study is how to reduce the size and weight of equipment to make it more suitable for portable operation.

Pipe handling and additional stringing cost must be reckoned with in double jointing. But since about half the welds are made automatically ahead of the manual welders in the pipe gang, daily footage of the spread is increased. And the substantial savings realized appear to justify extra

costs for double jointing on the right-of-way.

Where a yard operation would be practicable, the Price-O-Matic plant would be preferred by its owners. During two construction seasons in Canada, it has demonstrated its ability to make high-quality welds consistently and economically.

Ring and sleeve development . . . The purpose of the back-up ring is to conduct heat away from the weld metal to aid rapid solidification.

Glass sleeve protects the weld metal against copper pick up not permitted for an API specification weld. The sleeve, or belt, melts during welding. One sleeve is consumed by each weld. But sleeves could be furnished in quantity at reasonable prices.

The woven-glass sleeving was developed after considering various other materials including silicone elastimers, plastisols, sodium silicates, and floro carbon plastics.

Conley Plastics Corp. and Fibercast Corp., a subsidiary of Youngstown Sheet & Tube Co., collaborated in jointly developing the woven-glass sleeve.

FPC to Work Fast

on proposed rate increases pending since Memphis case.

THE FEDERAL Power Commission has promised speedy action on proposed natural-gas rate increases which have been pending since the "Memphis decision."

The commission indicated it will handle first those cases which were filed before the controversial ruling was handed down in November 1957.

In the so-called Memphis case, the U. S. Circuit Court of Appeals for the District of Columbia held that an interstate pipeline company could not raise its prices without prior consent of its customers. The ruling was reversed recently by the Supreme Court (OGJ, Dec. 15, p. 63).

More than half of the pending rate cases were filed before the 1957 court ruling. Because of the large volume of refunds to which customers may be entitled, the FPC said it was imperative that these cases be disposed of as promptly as possible.

The commission pointed out that the Natural Gas Act requires it to give preference to the disposition of rate cases.

In general, the commission will proceed with "locked-in" rate cases. These involve rate increases which are subject to refund for a specific period and have been superseded by later filings.

watching WASHINGTON

Joe Reilly

• Congress to tackle oil import problems . . .

THE NEW CONGRESS will jump into the oil-imports squabble soon after January 7.

This became almost inevitable as a result of the administration's long delay in working out a new control plan. Interested Congressmen have been looking over the cabinet committee's shoulder all along, but they were inclined to give the new program a chance to be tested before trying to scuttle it.

Now, new controls have been delayed until after Congress meets. Opposition to the new program has built up during the cabinet committee's long deliberations. It may erupt in the form of legislation designed to protect coal more than oil.

Rep. James E. Van Zandt (R-Pa.) led the field in promising Congressional action. He has announced plans to reintroduce a bill which would set quotas on imported crude and residual.

The President's advisory committee has been "forced to struggle with a most perplexing problem that should not have been made an Executive Department matter in the first place," Van Zandt contended.

"The job of deciding how to keep oil imports down to the levels specified in the Trade Agreements Act should never have been thrust on the Executive Department," he added. "I have said time and again that a so-called voluntary control plan is not workable."

Van Zandt, representing a coal-mining district, favors a cutback in residual imports because it would bring "new hope" to coal miners and railroad workers.

CONGRESS ALSO MAY be asked to overhaul the whole imports control program to give Canadian crude a better chance to compete for U. S. markets.

Knocking down barriers against Canadian oil is proposed by two members of the House Committee on Foreign Affairs who recently returned from a special study mission to Canada. Brook Hays (D-Ark.) and Frank M. Coffin (D-Me.) conclude in their report that the net effect of the voluntary import quotas was "detrimental to the interests of the United States and its Government."

"We cannot maintain friends if we refuse to trade with them and if we do not endeavor to protect their interests," the congressmen state.

"Any oil policy of the United States, while granting the greatest possible protection to United States producers, must also take into consideration the marketing needs and requirements of our friends. Otherwise, we are faced with deteriorating situations in many countries where oil is produced.

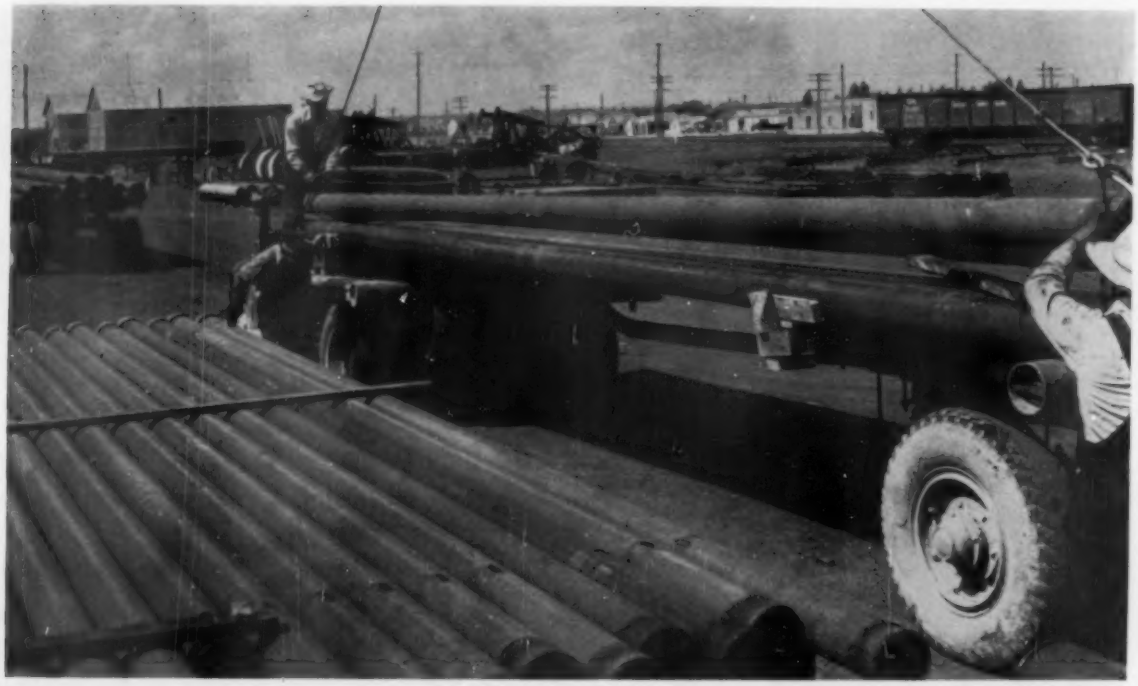
"Consequently, we recommend the abolition of the oil import quota system, at least insofar as Canada is concerned, in order to better serve our defense and foreign policy needs."

IN THEIR REPORT, the two Congressmen point to the possibility that Canada might impose quotas or tariffs to protect its own oil market.

Discussing the long-proposed pipeline from western Canada to the Montreal market, they conclude that markets for Canadian oil in Montreal "would have to be protected" if the line is to pay for itself.

"This would mean tariffs or quotas on outside oil," the report continues. "This in turn would mean higher costs to Montreal consumers."

If Venezuelan oil is forced out of the Montreal market, though, there is no assurance that Canadian oil will benefit in the long run. For Venezuela "might be forced to market its oil, at a lower price, on the United States west coast, displacing even more Canadian oil. But, say many Canadians, such would be the price of sovereignty, and many say they would be willing to pay that price."



USING UP inventories—the 1958 story of casing and tubing. But now . . .

Tubular-Goods Orders Are Picking Up

• Oil companies are running low on commonly used sizes of oil-country goods. Too, they're planning to do more drilling in '59. With business picking up, and a steel strike possible, buying should be brisk in the months to come.

OIL COMPANIES, on a buyers' strike most of this year, are returning to the tubular-goods market.

Some have nearly depleted their stocks of "bread and butter" pipe and tubing and are stepping up orders to supply houses.

During the first 9 months, sales of oil-country goods were less than 40% of the 1957 level. October saw a pick-up. When December figures are in, the year's buying may reach closer to one-half of last year's total.

The buying cutback brought temporary changes in buying-selling patterns, with stronger reliance on suppliers and less on company inventories.

There are three principal factors which will govern next year's tubular-goods buying:

. . . **More tubing and casing** will be needed, with drilling activity up and in inventories well-picked over for usable items.

. . . **River stocks,** set up this year to cut costs and speed delivery to buyers, appear here to stay.

. . . **Bugaboo** of a possible steel strike in mid-1959 may bring extra orders. To date, though, it hasn't caused any rash of scare buying as inventory insurance.

Buying begins . . . In early months of 1958, suppliers twiddled their thumbs with orders nearly nil.

Companies depended on inventories, whittled them down beyond low levels of other years and hesitated to replenish them with overnight replacements at hand.

Economy-minded companies used off-size pipe, smaller and lighter weights that were already on their "shelves."

More dual and triple completions, wider spacing, and a trend to the lighter weights—for instance, use of 9.50-lb. 4½-in. casing in place of 14-lb. 5½-in.—lengthened the buying moratorium.

One major company, for example, to October 1 had purchased less than 20% of the tubular goods bought in the same 1957 period.

An almost complete dearth of buying marked spring and early summer months, one supplier said. Orders began dribbling in late in August.

Not many companies have placed advance orders for the first quarter of 1959. Inquiries concerning available stocks are increasing, however.

Suppliers outlook . . . One steel representative believes there hasn't been a real tubular-goods shortage in years.

Rather, he feels impractical "hoarding" of goods in company yards has created the scarcities in recent years.

A Texas manufacturer thinks the industry as a whole has a 60-90 day supply of tubing and casing on hand now. Makeup of these inventories could be misleading, with many tons in deep-hole pipe, and only limited supplies of the 5½ and 7-in. casing and the more commonly used tubing on hand.

Tonnage-wise, inventories may be substantial but over-supply of seldom-used materials cuts the utility value.

Will there be a shortage? Pipe dealers feel the answer lies in "buying habits" of the user, not in ability of mills to produce.

One estimate of present river stocks places them at 250,000 to 300,000

tons. One supplier, for example, has about 1 million feet of 2⅜-in. OD tubing at Kansas City and comparable heavy stocks of other sizes and grades at Houston, Corpus Christi, Harvey, La., and Vidalia, La., river terminals.

And if a strike? . . . There is some disagreement on over-all effect of such a shutdown. Oil companies generally believe a strike, if one should materialize, would be of short duration.

Their own sparse inventories, plus use of suppliers' stockpiles, should tide them over even a prolonged emergency, they feel. Steel companies probably would enlarge considerably their river stocks.

On the other hand, some see company attitudes smacking of smugness and dependence on suppliers to meet any crisis. They hint that strike talk could stampede buyers into rush orders, melting river stocks overnight.

Some purchasing agents, all too familiar with the feast-or-famine steel picture in the past, are wary. They're trying to sell company management on the idea that their own inventories don't hold enough commonly used pipe to tide them over an emergency. Stocks of common sizes, they think, should be increased.

As yet, they haven't sold their story. There is little evidence of hedge buying to date.

"No one in industry," says one, "wants a strike, but we can't ignore possibilities." He said a large steel company reportedly will double its tonnage in river stocks during the next quarter.

Purchaser's dilemma . . . One buyer fears companies have been "spoiled" by this year's 12 and 24-hr. deliveries of tubular goods.

This "song of plenty," he says, may lull those responsible for drilling programs into a phony sense of security.

One Texas company tries to keep a 90-day supply of N and P grades of casing-tubing on hand and J grades for less than one quarter's operations.

Most late year buying has been for immediate use rather than to build up inventories. Generally, inventories have been cut to the bone and buying from field stocks is to fill current needs.

Who'll keep store? . . . One Texas steel-company representative hints a tug-of-war might develop between oil and steel companies over who will be forced to inventory pipe, if anyone.

The oil industry today is less inclined, he believes, to accept this chore and may insist suppliers keep it.

Some oil companies haven't been in financial position to build up inventories to previous levels, placing higher priority on money for other operations.

But the industry's economic picture has brightened considerably in the fourth quarter.

Next year it is expected that 53,000 wells will be drilled—a jump of more than 4,000 over 1958.

And tubular-goods buying, already picking up from its discouraging low, will be up sharply in the months ahead.

Tank Car Is Nation's Largest

. . . with capacity of 20,000 gal. Sun's new jumbo carrier is twice the standard size, cuts freight costs in half.

THE TREND toward larger railway tank cars was underscored last week when Sun Oil Co. began hauling products in the nation's first 20,000-gal. tank car.

The new car has twice the capacity of the standard size and holds 2,000 gal. more than the 18,000-gal. supertank cars introduced recently.

Lee A. Christiansen, Sun's general traffic manager, said the new car's chief advantage is an average 50% cut in freight costs. He pointed out that "because we are actually handling two tank cars in one, our loading and unloading costs will be reduced."

Another advantage is using the big tank cars instead of water transportation in areas normally icebound for 3 to 5 months each year. The new car "eliminates the need for massive storage facilities to hold a winter inventory at terminals on frozen water routes," he said.

Built by Union Tank Car Co. at Whiting, Ind., and called the UTLX 50000, the car will be used to haul lubricating and speciailty oils and petrochemicals from Sun's Marcus Hook, Pa., refinery, to such points as Cleveland, Pittsburgh, Detroit, Chicago, and St. Louis.

The car is 58 ft. long, 20 ft. longer than standard models, but only slightly larger in width and height. Width is 8 ft. and height, 14½ ft. Total weight, fully loaded, is 115 tons.

Christiansen said that since 1942 "the percentage of oil the railroads have been carrying in comparison with other means of transportation has diminished consistently from almost 20% to nearly 4%. These new cars could reverse that trend."

While this is the first 20,000-gal. tank car in use, others are on the production line, as well as more 18,000-gal. cars.

LPG tank cars are also being built with greater capacity. New propane cars are designed to hold 14,500 gal., as compared with 10,000 and 11,000 gal. in the old cars.

Panhandle Wins Long Fight

. . . to discontinue gas service to Michigan Consolidated. FPC orders American Louisiana to hike deliveries.

PANHANDLE Eastern Pipe Line Co. has been authorized by the Federal Power Commission to stop delivery of 127,000 M.c.f. of gas per day to a customer with which it had been feuding for years.

The order involves gas sales to Michigan Consolidated Gas Co. for distribution in the Detroit and Ann Arbor areas. The delivery is understood to be the largest ever authorized by the FPC to be discontinued.

Under the commission's order, Panhandle is to halt service to Michigan Consolidated on March 15, Panhandle was given 30 days to submit to the commission a plan for allocating the gas to other customers.

The FPC also directed American Louisiana Pipe Line Co. to increase deliveries to its affiliate, Michigan Consolidated, to offset the loss of Panhandle Eastern gas. American Louisiana and Michigan Consolidated are both affiliated with American Natural Gas Co.

Supply picture . . . Allocation of American Louisiana's uncommitted gas to the Michigan Consolidated market may hurt another affiliate's chances of expanding.

Michigan Wisconsin Pipe Line Co. had counted on part of the excess gas supply for its proposed expansion in upstate Wisconsin.

American Louisiana had 59,885 M.c.f. per day in original capacity which had not been permanently allocated. The company received FPC authority in October to add another 57,000 M.c.f. per day to its system's capacity. This brought American Louisiana's excess design capacity to 116,885 M.c.f. per day.

The difference between that and the volume needed to replace Panhandle Eastern gas would be made up by further increase in American Louisiana's throughput. The FPC noted that American Louisiana can handle up to 367,800 M.c.f. per day by using all compressors and to 385,000 M.c.f. or more by increasing its demand on suppliers in Louisiana.

Competition cited . . . History of the relations between Panhandle and the American Natural system, the FPC pointed out, "is a chronicle of disputes and litigation between the two systems both before us and in the courts."

At least part of their trouble "seems to have arisen from competition to service industrial customers in the Detroit area." As early as 1941, the commission said, Panhandle tried to secure customers served by Michigan Consolidated.

First contract between Panhandle Eastern and Detroit City Gas Co., predecessor to Michigan Consolidated, was executed in 1935. The contract was to expire in 1951.

Michigan Wisconsin, another Michigan Consolidated affiliate, put its system into operation in 1949. American Louisiana started supplying gas to Michigan Consolidated in 1956 (OGJ, May 21, 1956, p. 156).

As competitors moved into its market area, Panhandle Eastern sought repeatedly to abandon, first, part of its service and, later, all of its service to Michigan Consolidated. The company asked authority to redistribute gas volumes involved to other Panhandle customers in Michigan, Indiana, and Ohio.

The FPC held, in effect, that Panhandle Eastern's other customers needed the gas more than Michigan Consolidated did.

Michigan Consolidated had contended that loss of the Panhandle supply would cost its customers more than $5,000,000 a year. But the commission held that Michigan Consolidated "does not have a vested right" to the lower priced Panhandle gas.

Decision Due on Wide Spacing

. . . for Texas oil field. Sun makes plea for conservation in requesting state's second 160-acre well pattern.

TEXAS conservationists are awaiting with interest a decision by the Texas Railroad Commission on Sun Oil Co.'s application for wide spacing in a Texas Panhandle oil field.

Sun asked the commission earlier this month to approve 160-acre spacing for oil development in West Perryton field, Ochiltree County.

If the request is approved, West Perryton would become only the second field in Texas where such wide spacing is permitted. The first was Spraberry Trend Area field.

Sun's position went unopposed by other operators at a December 10 hearing in Austin. It was supported by Humble Oil & Refining Co. and Sunray Mid-Continent Oil Co.

West Perryton, discovered in July 1957, produces from the 8,100-ft. Morrow. With four wells on a proved producing area of 640 acres, the field is defined on the north, west, and southwest, but production likely will be extended to the east and southeast.

Along with the 160-acre spacing, Sun asked for 100% acreage allocation and per-well allowables at the 1947 yardstick figure for the 8,100-ft. depth of 253 bbl. per day.

Conservation tie-in . . . Sun filed a formal statement with the commission in support of wide spacing in West Perryton.

"Much has been written in recent months by authorities in the conservation field about the necessity for the domestic oil industry to quit drilling itself in the poor house," the statement said.

"It has been said . . . that in order for the industry to compete with foreign oil imports, it must drill its wells on ever larger production units until it is in a position to compete on an equal basis with foreign oil.

"The Texas Panhandle area . . . is an ideal place to attempt to do this."

Both pipelines and markets for its oil are few. Wells, Sun said, are relatively deep and cost about $140,000 to complete. Their competitive position is poor and getting worse.

West Perryton wells drilled to date, Sun said, are properly located for 160-acre development. Engineering data introduced at the hearing support 160-acre spacing as practical and feasible.

Approval likely . . . Best guess is that Sun's request will be approved.

Texas conservation laws fix minimum limits on spacing (with provision for exception in certain instances), but no maximum.

A commission spokesman pointed out that the agency some years back approved spacing up to 160 acres for the Spraberry Trend over considerable opposition from some operators in the field.

He implied that the prime reason such wide spacing hasn't been adopted in more fields since is that the industry hasn't asked for it. Such requests, of course, would have to be backed up to the commission's satisfaction with confirming evidence.

Broader Texas Tax Base Urged

. . . by study commission, which figures increased spending will outstrip revenue from heavily taxed oil industry.

TEXAS is more dependent on natural-resource taxation than any other state.

It imposes the highest permanent natural-gas and sulfur taxes in the nation and one of the highest oil taxes.

Last year state and local taxes on oil, gas, and sulfur in Texas totaled a whopping $305,200,000. They furnished roughly 32% of the state's tax revenue and about 16% of all local government revenue.

Severance and property taxes on these resources have shown a remarkable long-term ability to produce about 30% of the revenue needed for state expenditures, even though government costs have quadrupled in 12 years.

State spending, however, is almost certain to outrun climbing severance revenues in the next several years. Something must be done to prepare for this.

These are the conclusions of the Texas State Tax Study Commission, a body created by the last session of the legislature to study the state's tax structure.

The Texas oil industry has long sought such a study to show the great imbalance in Texas taxing. It argues that the state tax base should be broadened—that government cannot keep tapping oil and gas whenever it needs more money without reaching the point of diminishing returns and weakening the industry.

Sen. William Fly, chairman of the commission and also of the state senate's finance committee, said the study has convinced him that Texas needs a broad-base tax structure to meet rising state-government costs.

Gas gathering tax? . . . The commission's report estimated that a gathering tax on gas being taken out of the state would raise an added $40,000,000 annually.

Fly, however, doubts that a constitutional tax of this kind could be written. Such a measure was dealt a death blow by the U. S. Supreme Court in 1954 as being unconstitutional.

How Texas compares . . . The commission, in studying natural-resource taxes in the 10 leading mineral-producing states, found that five states impose only property taxes, two only severance taxes. Texas, Kentucky, and Minnesota, however, impose both.

Of all states using both methods, only Colorado has a higher severance tax on oil than Texas. And Colorado's tax is lower for small producers.

Louisiana has the highest severance tax on natural gas. But this is a temporary tax and is due to be reduced substantially in mid-1960.

Louisiana also leads in total taxes on oil. Texas ranks close behind, with heavier oil taxes than Oklahoma, New Mexico, Arkansas, and Mississippi.

Atomic-Blast Meeting Set

PROPOSED USE of nuclear explosions to extract oil and gas from the nation's vast oil shale deposits will be outlined at a meeting in Dallas January 6-7.

Atomic Energy Commission scientists and top oil and chemical industry representatives will attend the conference, sponsored by the U. S. Bureau of Mines.

AEC scientists have been considering the possibility of setting off a nuclear underground blast in northwestern Colorado. Some contend that one thermonuclear explosion beneath an oil shale bed might free up to 25 million barrels of oil. An underground atomic explosion would shatter millions of tons of the black rock. The resulting underground fire would distill gas and oil out of the shale.

PROCESSING BRIEFS . . .

Anderson Refining Corp., Dallas, has resumed operation of a small refinery at Tucker, Tex., southwest of Palestine in the Long Lake field area of Anderson County. The refinery, shut down since 1955, is running on a trial basis with a topping unit turning out gasoline, jet fuel, and diesel fuel. The plant was built in the 1930's by Byrd-Frost, Inc. It has changed hands several times with the latest owner, prior to Anderson Refining, being Corpus Christi Refining Co.

A new UOP catalytic condensation unit is on stream at International Refineries' 11,000-bbl. Wrenshall, Minn., plant. Feed capacity of the new polymerization unit is 1,150 bbl. daily of light olefins derived from catalytic cracking.

Work will start in March on Warren Petroleum and Sunray Mid-Continent's natural-gasoline plant in Mocane gas field, Beaver County, Oklahoma Panhandle. Dresser Engineering Co. of Tulsa expects to complete the job by September. Capacity will be more than 100,000 M.c.f. daily. Processed gas will go to Colorado Interstate Gas Co. Plant site is 1½ miles west of the town of Mocane.

Asphalt capacity of Monsanto's Lion Oil Division will nearly double next spring when the company completes a new solvent-deasphalting plant at El Dorado, Ark. Contract for the 5,260-bbl. unit has been awarded to Badger Manufacturing. The unit is part of a big expansion at the 29,000-bbl. refinery (OGJ, Sept. 8, p. 81).

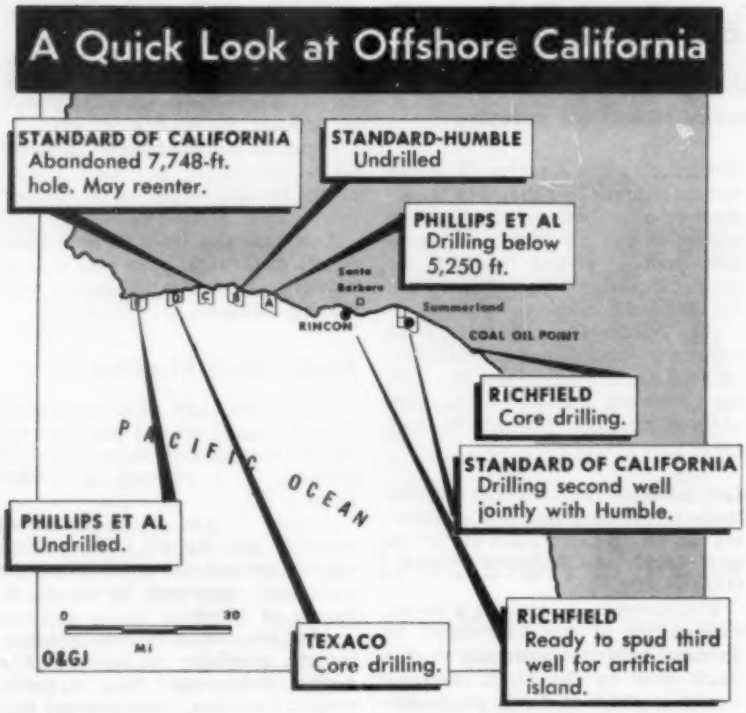
A $450,000 expansion of American Gilsonite's refinery near Fruita, Colo., is planned next year. Reactor and compressor capacities will be increased in the catalytic reformer, along with additional handling and storage facilities for coke. Gilsonite processing capacity will be boosted from 700 tons per working day to 850 tons. The expansion project is to be completed next summer.

Shell is installing a new automatic molding machine that will turn out 10,000 lb. of wax per hour at its Houston lube plant. Installation will be completed next May. In addition, an automatic packing machine and conveyor equipment are being installed.

Also for Refiners . . .

IN THE NEWS: Sun's new railway tank car is the nation's largest (p. 75) . . . Construction starts on Esso's Rotterdam refinery (p. 84) . . . Fish proposes petrochemical complex for Argentina (p. 86).

PLUS THIS TECHNICAL REPORT: Process Costimating (p. 145).



Offshore Hunt Pushed

. . . on high-priced new West Coast tracts. Two field discoveries in 1958 spark core drilling on other parcels.

CALIFORNIA'S much heralded offshore oil campaign is making up in cautious but steady drilling what it currently lacks in glamor.

This is the situation on the West Coast at year end:

. . . **Winners** of last July's parcel offering have wasted no time trying to evaluate their $55-million purchases. Drilling has started or is planned on three of the five parcels.

. . . **A development drilling** program, meanwhile, is centering around Santa Barbara County.

. . . **The core-drilling** fleet is almost idle as evaluation activity generally has slowed down while the state marks time on offering any new leases.

New areas . . . Standard Oil Co. of California, The Texas Co., and Phillips Petroleum Co. all acted quickly to evaluate their parcels acquired in July.

California Standard only recently abandoned its 7,748-ft. hole drilled on Parcel C. The word "abandoned" actually is a slight misnomer. The hole was capped so that the company can go back into it later.

The parcel was won by California Standard jointly with Humble Oil & Refining Co. for a cash bonus bid of $12,423,598. The mobile platform used to drill the evaluation hole has been released to Texaco.

Meanwhile, Texaco currently is drilling a core hole below 4,500 ft. on Parcel D, 1½ miles offshore in 84 ft. of water. Texaco, Monterey Oil Co., and Newmont Oil Co. were awarded the lease on a record setting bid of $23,711,538 ($6,175 per acre).

Phillips is drilling below 5,250 ft. about 1½ miles offshore on Parcel A. It is using a unique drilling barge, consisting mainly of a modified onshore rig mounted on a barge fabricated from the center section of a dissected tanker. Phillips, in association with 41 other firms and individuals, got this parcel for $13,550,000.

Only Parcels B (Standard-Humble at cost of $770,838) and E (Phillips, et al., at cost of $5,100,000) are still undrilled.

Activity elsewhere . . . Santa Barbara County dominates the offshore picture at present.

In addition to the five new parcels, other active areas include:

. . . **Summerland.** California Standard is drilling past 4,000 ft. on its second well on a 5,500-acre lease it holds jointly with Humble.

A discovery well on the lease was completed recently after it tested at rate of 865 bbl. daily from an undisclosed interval. The well was bottomed at around 7,400 ft. when the discovery announcement was made.

The acreage was the only wildcat lease awarded under original terms of the Cunningham-Shell Act of 1955. It went to Standard-Humble for $7,250,000. Standard estimated it had $12 million in the lease before the first test was spudded.

. . . **Rincon.** Richfield Oil Corp. is getting ready to spud its third test on a 1,170-acre lease.

Drilling is from an artificial island ½ mile offshore in 45 ft. of water. The first well is making 62 bbl. daily of 30.3°-gravity crude from 2,421-2,521 ft. The second is producing 76 bbl. daily of 30°-gravity crude from 2,649-2,719 ft. The island is designed to accommodate more than 60 wells.

. . . **Coal Oil Point.** Richfield recently resumed core drilling from a floating barge on its 1-by-3-mile offshore lease just west of Santa Barbara.

The core boat "Rincon" is doing the work and operating in 300 ft. of water. Latest report put hole depth past 4,400 ft. Richfield, jointly with Honolulu Oil Corp. and Signal Oil & Gas Co., holds a similar sized lease adjoining this one. Several tests previously have been slant drilled into the parcels from an onshore site.

Operations offshore elsewhere in the state are quiet. The state's big core-

PIPELINE

A new metering system to measure crude for automatic custody transfer from Suntide Pipe Line to Suntide Refining Co. at the Corpus Christi plant is under way. Four positive-displacement meters will do the job now accomplished by tank gaging. The system will handle 50,000 bbl. daily.

The first increase in Canadian pipeline deliveries over the comparable 1957 period was recorded during October, according to the Dominion Bureau of Statistics. Net deliveries were 22,866,658 bbl. compared with 22,735,509 bbl. for October 1957. The increase was recorded in spite of a drop in exports by pipeline from 3,709,234 to 1,834,614 bbl. from a year ago.

A 65-mile, 16-in. line to be built

boat fleet, except for the "Rincon" is idle.

Operations also have shut down on small 640-acre offshore leases north of Huntington Beach held by Richfield-Signal-Hancock. The lease holders have on file with the state a request for deferment of drilling requirements.

A 500-acre parcel held by Tidewater Oil Co., adjoining the Summerland lease of Standard-Humble also is idle. Tidewater also has asked for deferred drilling. Two dry holes were drilled on the lease from an onshore location 2 years ago. This was the only development lease awarded by the state under original terms of the Cunningham-Shell Act.

New bidding . . . The July parcels actually represent only a small part of state tidelands made available in 1955. But no requests for additional acreage have been filed by oil companies in more than a year.

The state put these five parcels on the block in advance of any industry requests. The industry several years ago had shown an interest in the acreage. Before the state could act, the legislature took the parcels off the market while lease rules were rewritten. When new rules became effective, the state acted on its own in offering the parcels.

This won't happen again, according to a leading state official. Hereafter, oil companies will have to ask for acreage before the state will offer it for bidding. This is in line with recommendation of consultants hired by the state last year.

The only time the state will act on its own is when a threat of drainage by offsetting production faces the unleased lands.

New factor . . . A move to change the leasing rules has popped up again.

Alan Cranston, newest member of the State Lands Commission, said recently he favored making the royalty rate the biddable factor in all offshore offerings. This would replace the cash bonus method used this far.

Cranston said he thinks the state will lose millions unless the royalty is made the biddable factor. Doubt has been cast on the wisdom of Cranston's argument by what happened on two state leases at Huntington Beach.

Monterey, Humble, and Seaboard Oil Corp. paid the state $4,667,066 in 1955 for two 1,280-acre offshore parcels at Huntington Beach. Both adjoined the huge Huntington Beach field in Orange County and were believed sure producing properties. This fall they were dropped by the operators after a series of expensive, deep dry holes. In this case, the state pocketed the $4,667,066 but would have missed out under Cranston's royalty-bid method.

Canada Moves Heavy Crude

HEAVY asphalt crude is moving by pipeline from western Canada to markets in eastern Canada for the first time.

British American Oil Co., Ltd., is buying 4,000 bbl. of 13.9°-gravity crude produced by Royalite Oil Co., Ltd., in Coleville field, Saskatchewan. The crude is blended with 32°-gravity crude from nearby Smiley field and shipped east by Interprovincial pipeline.

Royalite will shut down its refinery at Coleville and transfer asphalt manufacture to its other refineries. By next summer, all Coleville crude will be blended and moved east at a rate of 8,000 bbl. daily.

Gulf Tests Planned

by Texas Co. to evaluate further State Lease 340.

THE TEXAS CO. is planning two more wells in its "tight" Marsh Island area off Louisiana.

It's kept secret whatever it has found in other drilling so far, but apparently Texaco is sufficiently satisfied to spend more money in the long-disputed State Lease 340.

The company has applied for a permit to drill No. 2 Southwest Marsh Island State 8,000 ft. northwest of its No. 1 well. Scout reports last summer called the No. 1 a "good discovery." Texaco at the time had "nothing to report" (OGJ, Aug. 11, p. 80). The new location is about 39 miles southwest of Jeanerette, La., off Iberia and Vermilion parishes.

Texaco also is reported planning a second well close to the No. 1 South Marsh Island State, another tight hole about 8 miles to the east.

Control of State Lease 340 is claimed by both the U. S. Government and the State of Louisiana, and drilling permits must be approved by both agencies (OGJ, May 5, p.72).

BRIEFS . . .

by Permian Basin Pipeline, subsidiary of Northern Natural, has been contracted to R. H. Fulton. The contractor will get under way in January on the $3,681,600 project to take gas from Emperor field, Winkler County, Texas. Producers in the field are Sun, Tidewater, and Phillips Petroleum.

A dual pipeline system of 55¾-in. and 43¼-in. pipe is being completed by Williams Brothers for Carnegie Natural Gas, a subsidiary of U. S. Steel. The $15-million project will transport 255,000 M.c.f. daily of coke-oven gas to six Pittsburgh area plants. A bank of 11 compressors at Clairton will pump gas into the line at 15 psig.

Special rolls were made by U. S. Steel's American Bridge Division to fabricate the pipe, which is the largest diameter ever used for a gas line. The contractor designed, engineered, and constructed the line on a turnkey deal.

A $275,000 crude line will be built in Wyoming by Teton Pipeline Co., Denver. The 8-mile 5-in. line will connect O'Brien field, Carbon County, with the Sinclair Pipe Line system. Teton, a subsidiary of Western Crude Marketers, Inc., has asked the Wyoming Public Service Commission for approval.

A new pipeline-construction company has been organized by Clark Williams, former general superintendent, and Louis H. Byers, former attorney, for R. H. Fulton & Co., Lubbock contractor. They will operate out of Dodge City, Kans., under the name, Shamrock Constructors, Inc.

Also for Pipeliners . . .

IN THE NEWS: H. C. Price develops a new idea for right-of-way double jointing (p. 72) . . . Panhandle Eastern wins its long fight to quit selling gas to a competitor (p. 76) . . . CIG rate settlement calls for $38.5-million refund (p. 80) . . . Hope Natural plans to move Louisiana offshore gas to the East Coast (p. 82).

PLUS THIS TECHNICAL REPORT: Pipeline construction survey (p. 147).

CIG Settles Rate Feud

. . . with 12 customers. Refund of $38.5 million to clear way for huge expansion program in Rocky Mountains.

COLORADO Interstate Gas Co. is getting back on a firm financial basis for the first time in 5 years following compromise settlement of three rate disputes with 12 distributor customers.

W. E. Mueller, CIG president, said the agreement to refund $38.5 million, instead of a possible $85 million, opens the way for the company to go ahead with its $91-million Utah project. Under this expansion, now pending before the Federal Power Commission (OGJ, Nov. 17, p. 142), CIG will increase capacity to the Rocky Mountain area by 50,000 M.c.f. daily.

The company also will deliver 400,000 M.c.f. daily to El Paso Natural Gas Co. in Utah for sale in California markets.

Colorado Interstate agreed to the refund on gas purchased under increased rates from January 1, 1954, to February 5, 1958.

The agreement has been filed with FPC. Still to be settled is a fourth rate increase made last February 5 as the result of increased costs for gas purchased from Pacific Northwest Pipeline Corp.

The refund is $2.3 million more than CIG had offered. Of the total, $33.3 million is principal and $5.2 million is interest at 6%. CIG is now expected to recapture an estimated $5 million in income taxes paid in 1955 on money which, under the agreement, will be refunded to its customers.

The settlement removes the possibility that CIG might be liable for the entire $85 million it has collected under the four rate increases (OGJ, June 30, p. 60).

By refunding the $38.5 million, this leaves CIG with $46.5 million collected during the period of the disputed rates. But the company still has a fourth rate increase to settle so will not retain all of the $46.5 million.

CIG will make the refund to its distributing companies within 90 days after the FPC approves the settlement. These companies will then make refunds to gas consumers under arrangements worked out by state public-utilities commissions.

Refunds . . . The refund will include these amounts for distributing companies:

Public Service Co. of Colorado, which serves the Denver area, $15,612,171; city of Colorado Springs, $2,834,630; Pueblo (Colo.) Gas & Fuel Co., $2,281,841; Colorado-Wyoming Gas Co., which serves northern Colorado cities and Cheyenne, Wyo., $5,727,005; Natural Gas Pipeline Co. of America, for the Chicago area, $10,447,860; city of Trinidad, Colo., $227,773; Eastern Colorado Utility Co., for the town of Eads, $3,402; Greeley Gas Co., for the town of Canon City, Colo., $271,078; Kansas-Colorado Utilities Co. and Plateau Natural Gas Co., for Castle Rock and other Colorado communities, $260,681; Southern Union Gas Co., which serves Clayton, N. M., $99,330; and Citizens Utilities Co., $774,996.

Reaction . . . Mayor Will F. Nicholson, who earlier had demanded a $41-million refund for Denver alone, termed the agreement "a good settlement for all gas customers . . . because it will enable them to receive the money which is due them much faster than would have been possible otherwise."

U. S. Sen. John A. Carroll (D-Colo.) denounced members of the FPC for participating in negotiations which led to the settlement.

"The FPC is supposed to be a quasi-legal body," he said. "Yet it has been holding ex-parte hearings at which members of the commission conferred secretly with company representatives, while representatives of the consumers were not invited.

"The FPC went even further. Certain commissioners went into Colorado and other parts of the area affected by the rate increases and even brought pressure on litigants to compromise this matter."

New rates . . . Mueller said his company expects to make a proposal for future gas rates within 30 days after the FPC order approving the settlement becomes final.

"This proposal will call for a reduction in our present rates," he promised. "The exact dollars and cents figures aren't available at present."

Mueller indicated there will be an additional refund to distributing companies on gas purchased between last February 5 and the date of final settlement.

Key NPC Decision Due

. . . in special January meeting. Question is whether to accept more government control or end advisory service.

SHOWDOWN in the National Petroleum Council's long dispute with the Government has been delayed until late next month.

NPC Chairman Walter Hallanan canceled the scheduled December 29 meeting of the council because of transportation bottleneck caused by airplane strikes. He indicated the meeting will be rescheduled for late January.

Chief topic before the council will be proposed changes in its makeup and operating procedure to meet requirements laid down by the attorney general governing business advisory groups.

The council has been virtually inactive during the past year as a result of the Government's attempt to exercise stronger control over its activities.

Interior Sec. Fred A. Seaton has urged council members to adopt the proposed changes and "carry on the advisory activities and studies . . . which are of vital importance to the Department of the Interior and other Federal agencies."

Changes proposed by the Government include:

. . . **Appointment** of full-time salaried officials of the Interior Department as co-chairmen of the council and its committees.

. . . **New procedures** for appointment of committees and subcommittees and for conduct of meetings.

. . . **Rules** governing the preparation and custody of minutes of meetings.

. . . **Provisions** for calling of meetings and preparation of meeting agenda.

Seaton announced last week that most of the council members had been reappointed for 1959. The new council will have 102 industry leaders as compared with 104 in 1958.

New members of the council will include Glenn W. Clark, replacing J. J. Hedrick as representative of the Independent Natural Gas Association of America; Eugene R. Locke, replacing J. J. O'Brien for Texas

Independent Producers & Royalty Owners Association; John L. Matthewman, replacing Robert L. Crawford for the Independent Oil Men's Association of New England, Inc.; W. T. Powell, replacing Grover Kilgore for the Petroleum Equipment Suppliers Association; J. T. Wolfe, replacing R. W. Otto for the AGA.

Joseph Zeppa, replacing J. U. Teague for the American Association of Oilwell Drilling Contractors; Lester A. Wilsey, replacing Frank L. Brimm for National Tank Truck Carriers, Inc.; Albert L. Nickerson, replacing B. Brewster Jennings for Socony Mobil Oil Co., Inc.; and Frank O. Prior, replacing Robert E. Wilson for Standard Oil Co. (Ind.).

Also omitted from the council for 1959 are Russell S. McFarland, who retired this year as president of Seaboard Oil Co.; and W. K. Warren, chairman of Warren Petroleum Corp.

Texas '58 Oil Flow Off 13.9%

EXTENT of the declines in production, drilling, and refining suffered by the Texas oil industry in 1958 was revealed last week by the Oil and Gas Division of the Texas Railroad Commission.

Oil production fell 13.9% below 1957's flow. Actual output ran about 910,623,200 bbl. It was 1,057,997,390 bbl. in 1957, which means a 1958 drop of 147.3 million barrels.

Producing days permitted by the commission during the year numbered only 122, a drop of 49 or 28.6% from the 171 days the year before.

Comparative percentages between production and producing days bear out one commission contention: Drastic cutbacks in Texas crude-oil production during the last 2 years do not reflect on the state's ability to produce.

"They were made necessary," the commission says, "by excessive inventories of crude oil and products which accrued during and after the Suez crisis. This was coupled with a weak demand due to warmer-than-normal weather in the fourth quarter of 1957 and the mild 1957-58 business recession."

In other segments of the industry in Texas, here is the 1958 record:

. . . **Well completions:** 20,392, down 3,742. Oil completions were 12,086, off 2,848 wells; gassers 2,074, up 149; and dry holes 6,232, down 1,043.

. . . **Wildcats:** 4,152, down 802. Of these, 3,697 were dry, 385 oil producers and 70 gassers.

. . . **Dry gas production:** 4.364 trillion cubic feet, up slightly from 4.209 trillion cubic feet in 1957.

. . . **Casinghead gas:** 1.652 trillion cubic feet, a drop from 1.828 trillion cubic feet in 1957. Liquid hydrocarbons extraction fell to 193.6 million barrels from 194.3 million barrels.

. . . **Refinery runs:** 764,827,612 bbl. compared to 808,409,037 bbl. the year before. Gasoline production jumped from 17,455,239 bbl. to 23,182,536 bbl. All other products declined.

Chemicals Pick Up

during last half of 1958, point to good year ahead.

THE CHEMICAL industry, and its important segment, petrochemicals, are staging a steady comeback. Since midyear practically all activity has picked up and the carryover to 1959 points to another record next year.

This overall look was taken last week by Manufacturing Chemists Assn. Here are the highlights of its report:

Sales moved up from a March low of $1.745 billion to $2 billion by August, with the year's estimate ranging $23.3 billion to $23.7 billion, very close to 1957.

Profits are off from 1957, but moving up at present. During the first three quarters of 1958, profits after taxes ran 6.7% of sales vs. 7.8% in 1957. By the third quarter, the figure had climbed to 7% however.

Production index for chemicals and allied products averaged 182 through October but rose to 188 in October. Last year's index averaged 184.

Total assets rose from $20.15 billion a year ago to $20.4 billion on October 1.

Capital expenditures are estimated at $1.338 billion for the year, compared with $1.724 billion in 1957.

Research will cost about $560 million for 1958 and $600 million by 1960.

the JOURNAL *said . . .*

50 years ago

December 20, 1908

Twelve strings of tools still are running in Florence (Colorado) field . . . production is holding up and some wells drilled 19 years ago are still doing nicely.

Indications of natural gas along the Louisiana coast presage an enormous supply of this material for industrial purposes in the next few years . . . Indicated resources of salt, sulphur, and petroleum make it evident that southern Louisiana of necessity must become the seat of chemical industries.

Deep tests in the interesting Belle Isle region on the Louisiana coast show the existence of salt at the phenomenally great depth of 2,600 feet.

Prairie Oil & Gas Co. has filed survey maps for a proposed 549-mile, 12-in. pipeline from Jenks, near Glenn Pool, Oklahoma, to New Orleans.

25 years ago

December 28, 1933

Oil Administrator Harold L. Ickes (Secretary of the Interior) places development of new oil fields under his control . . . Drilling in new pools will be curbed to prevent unrestricted development of excessive potentials.

Closely following its recognition by the U. S., the Russian Government is starting negotiations for sale of Russian petroleum products to American oil companies and purchase of American equipment for Russian oil field and refinery operations.

Completion goal for Iraq Petroleum Co.'s 1,350-mile pipeline to Mediterranean terminals is advanced to October 1934.

Gulf Coast terminals have set a new record in shipments of crude oil and refined products. East Texas oil flood helps boost loadings for year to more than 290,000,000 bbl.

10 years ago

December 30, 1948

Texas and Louisiana plan strong court battle against Department of Justice suit asserting federal jurisdiction over Gulf of Mexico offshore oil lands.

First experimental shipment of Middle East crude oil to West Coast of United States is due at Standard Oil Co. of California's Richmond refinery near San Francisco.

Stanolind Oil Purchasing Co. takes over all activities and agreements of Standard Oil Co. (Ind.) for purchase and sale of crude oil in Oklahoma, Kansas, Colorado, and Wyoming.

Ira H. Cram, formerly Pure Oil Co.'s manager of exploration, will direct Continental Oil Co.'s expanded exploration program in newly created vice presidency post.

Offshore Gas Going East

. . . in new package deal. Transmission firms will expand to haul gas for Hope Natural, affiliated distributors.

A NEW PROPOSAL to deliver up to 100,000,000 cu. ft. of gas daily from offshore Louisiana to eastern states was laid before the Federal Power Commission last week.

The plan will mean $40 million in new pipeline construction by Texas Gas Transmission Corp. before it goes into operation—with FPC approval—by next November.

Hope Natural Gas Co. proposes to use its own production in offshore Louisiana, supplemented by purchases from others, to supply affiliated distributing companies in Ohio, West Virginia, and Pennsylvania.

Texas Gas Transmission will gather the gas and transport it to a point near Lebanon, Ohio.

Texas Eastern Transmission Corp. will pick up the load at Lebanon and transport it to the lines of Hope Natural and its affiliates for delivery to the ultimate customers.

The package deal, in the making for months, indicates the growing trend toward direct purchase of gas in the field by distribution companies.

The transmission company performs a straight transportation service, instead of buying gas for resale. Hence there is no FPC regulation of the sale.

The source . . . Hope will use the production from five wells it has developed in Block 4, East Cameron area, as part of the 100,000,000 cu. ft.

The company has entered into gas-purchase contracts with other firms to supply the remainder.

Among these is J. Ray McDermott, Inc., which has reserves in a 5,000-acre offshore block in the West Cameron area. McDermott has a 50% interest in the lease, while Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc., have 25% each.

Contract price for the McDermott reserves is 21½ cents per 1,000 cu. ft. for the first 4 years and periodic increases for 4-year intervals. The contract is for 20 years.

Texas Gas' program . . . New lines and looping to handle the gas will require about 246 miles of new pipeline and the addition of 15,760 hp. to the Texas Gas Transmission system from the Gulf Coast.

The Texas Gas application to the FPC is separate from a $20-million expansion authorized in October to meet the company's requirements for existing customers during the 1959-60 heating season.

Financing of the new $40-million program is now being obtained, Texas Gas said.

The new construction would consist of 165 miles of 30-in. loop lines and 81 miles of 26-in. loop lines in Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Indiana, and Ohio.

The gathering system in offshore Louisiana will consist of 93 miles of supply lines, ranging in size from 2⅜-in. to 12¾-in.

Construction would require about 6 months after the FPC grants authority.

Final delivery . . . Hope Natural, a Clarksburg, W. Va., subsidiary of Consolidated Natural Gas Co., is purchasing the gas for five Consolidated subsidiaries. They will pick up the gas from Texas Eastern.

The five are East Ohio Gas Co. in Ohio, River Gas Co. in Ohio, New York State Natural Gas Corp. in Pennsylvania, Peoples Natural Gas Co. in Pennsylvania, and Hope Natural in West Virginia.

INDUSTRY BRIEFS . . .

Ernest O. Thompson, veteran member of the Texas Railroad Commission, has been named chairman of the agency for 1959-60. He has been a member of the commission since 1932 and has served as its chairman four times previously. In announcing the change, Olin Culberson, outgoing chairman, described his colleague as "the daddy of all oil conservation."

Drilling in Nebraska's Sidney area by Ohio Oil will be on a contract basis—instead of by company-owned rigs—after January 1. R. E. McMillen, district manager, said it's more economical to drill in that region by contract than with company crews.

A triple pumper, believed to be the industry's first, has been approved by the Texas Railroad Commission. The well is the 1-B Skelly-Stokes operated by R. S. Anderson, Midland independent, in the Rocker "A" fields area of Garza County. San Andres, Glorieta, and Clearfork pays will be pumped with one set of rods through 2-in. tubing, 1-in. tubing, and hollow rods, all run side by side in 5½-in. production casing (OGJ, Dec. 15, p. 73). Deepest pay is 3,247 ft.

Crown Central Petroleum is asking $10 million in a breach of contract suit filed in federal district court in Houston last week against Gabriel Oil, Houston. It charges Gabriel agreed in writing to sell foreign crude to Crown Central, but that Gabriel later failed to sign the contract. According to Crown Central, the contract called for Crown Central to buy foreign crude in quantities equal to Gabriel's import quota of 7,500 bbl. daily.

A thermal recovery pilot test is being conducted by Continental Oil at its North Tisdale field in Wyoming's Johnson County. About 3 years will be spent on the new process in the field. The field was discovered in July 1952 and contains 22 producing wells.

Four top officers from both the Oil, Chemical and Atomic Workers Union and the International Chemical Workers Union will meet in Cleveland, Ohio, January 8 to take the first step toward merging of the two organizations. They'll draft a proposed constitution for a merged union as directed in resolutions adopted earlier by conventions of both organizations. The next step will be a meeting of a 40-member merger committee sometime between next March 15 and May 15.

Lion Oil has sold 15,000 acres of undeveloped property in East Texas to Claud B. Hamill, Houston. The acreage is located in 17 counties. The price reportedly was $110,000.

The Texas Railroad Commission has approved a unitization agreement and water flood expected to recover an added 3,700,000 bbl. of oil from the Spraberry sand in Cope field of Sterling, Reagan, and Tom Green counties, West Texas. The unit, operated by Honolulu Oil Corp., takes in roughly 1,700 acres in the field. The Spraberry in the field is topped at about 5,100 ft.

Venezuela Jumps Oil Profits to 60%

• Industry reaction is critical of new tax move wiping out traditional 50-50 split. Action is surprise to new president-elect, but he may have to accept it.

VENEZUELA, the country which gave birth to the 50-50 profit split from oil operations that has been a world-wide pattern for 15 years, last week broke the formula and is demanding 60%.

The surprise move caught the oil industry flatfooted. It reacted with a mixture of anger and alarm. The specter of nationalization tempered most official comments with some caution, but privately many oil men are saying Venezuela may be throttling the goose that lays its golden eggs.

Strongest censure of the move came from H. W. "Duke" Haight, president of Creole Petroleum, the country's biggest single producer which accounts for more than 1,000,000 bbl. of Venezuela's 2,500,000 bbl. daily production.

Haight, in effect, said Venezuela has broken faith with the oil industry. He charged Venezuela disregarded acquired rights and ignored the moral if not legal obligation to negotiate with interested parties.

A similar statement was issued in New York by Eugene Holman, chairman of Jersey Standard, Creole's parent company:

"This action by the provisional government of Venezuela will almost certainly call for reexamination of international investments . . .

"While it is too early to foretell what will happen the result may well be lower real income to the Venezuelan nation than it has been receiving under the equal sharing agreements."

At almost the same time officials of both Shell Oil of Venezuela and Socony Mobil of Venezuela voiced the same opinion. "It will doubtless be necessary now for the company to revise carefully its plans and projects for future investments," Shell said.

James Tong, president of the Socony Venezuelan company, said that the adverse effect of the tax boost can hardly be exaggerated.

The surprise . . . The governmental decree that reverberated throughout the oil world has political as well as economic overtones.

H. W. "Duke" Haight
. . . a hard blow at oil industry.

It was announced suddenly last week by Jose Mayobre, finance minister of the temporary provisional government which goes out of existence next month.

Obviously just as surprised as the oil industry was Romulo Betancourt, the leftist president-elect, who campaigned for the presidency on a platform of more oil revenue for the country. Betancourt said repeatedly that this was a subject for negotiation between Venezuela and the oil companies.

The new tax structure decreed by the Venezuelan junta is retroactive to last January 1. Mayobre said more income is needed to wipe out the $513-million deficit left by the regime of Marcos Perez Jimenez, the ousted dictator. Venezuela is running even further into the red in its current fiscal year. The added deficit is estimated to be $537 million.

What the junta did was juggle the sliding scale of Venezuela's supplementary or income surtax. Before last week this ranged from 1.5% on a net income of $3,090 to 26% on net income over $8,652,000. This tax is in addition to a base tax of a flat 2½% levied on all net income.

Under the junta decree the supplementary tax will now range from 2% to 45% on the same income brackets.

In the confusion that surrounded the surprise move, oil men said that the junta idea that this would bring the country 60% of the oil income instead of 50% is "conservative." The new tax could make the split far more lopsided.

A third income tax—a straight 50% of all net income which exceeds the total paid by any company to the government in royalties, income, and other taxes—is not affected by the new decree. It's not necessary to alter it. Under the new supplementary tax schedule its hardly likely that any company will show a net profit even approaching the total paid the government.

It was this third tax which gave birth to what is popularly called the 50-50 formula.

What it could mean . . . Because of the timing of the new decree and the confusion surrounding the move, it is still difficult to tell exactly what it will mean.

If, and this appears to be a major question, the provisional government sticks to the new tax schedule, Betancourt may be forced to uphold it for political expediency. If he should overturn it as soon as he takes office, volatile Venezuelans may react violently and toss him out as they did Jimenez.

If the companies are stuck with the new tax rates, they apparently will have three choices:

. . . A cut in net income and profits. This is hardly likely because most companies operating in the country feel that the continual plowing back of profits into the industry and the risk of operating outside the U. S. entitles them to the profits they are making.

. . . Sharply curtailed investments in Venezuela. Under a tax burden they regard as onerous, few oil companies are likely to make any more new capital investments in Venezuela than they have to. They are likely to cut back sharply on income which they normally plow back into the industry in Venezuela.

Creole's capital expenditures in 1957 were nearly $261 million com-

pared to a net income of roughly $397 million.

. . . **A sharp rise** in the price of Venezuela's crude.

There was widespread speculation that companies which try to maintain past profit margins under the new tax schedule will be forced to raise crude prices. Estimates of the price boost where soaring as high as 70 cents a barrel. Such an increase would make crudes competitive with Venezuelan oil at U. S. prices. It would certainly endanger Venezuela's Canadian markets.

A price increase of this nature could cost Venezuelan oil its worldwide markets. Middle East oil would be cheaper almost any place in the world, in spite of transportation costs.

Venezuela's action might well stabilize the 50-50 formula in the Middle East where it is already subject to some erosion. The Arab oil-producing nations might shelve any ideas of a bigger cut of oil profits if they faced the prospect of moving into traditional Venezuelan markets and by doing so increasing production and their own oil income.

The last two of these "iffy" possibilities would be far more damaging to Venezuela than to the companies themselves. Especially in view of the fact that Jersey Standard, Royal Dutch-Shell, and Gulf, which control about 80% of Venezuela's production, have alternate sources of crude in the Middle East.

In the past . . . While it is known as the 50-50 formula, this system of paying royalties and taxes to Venezuela has not actually meant an equal division of oil income between the industry and the country.

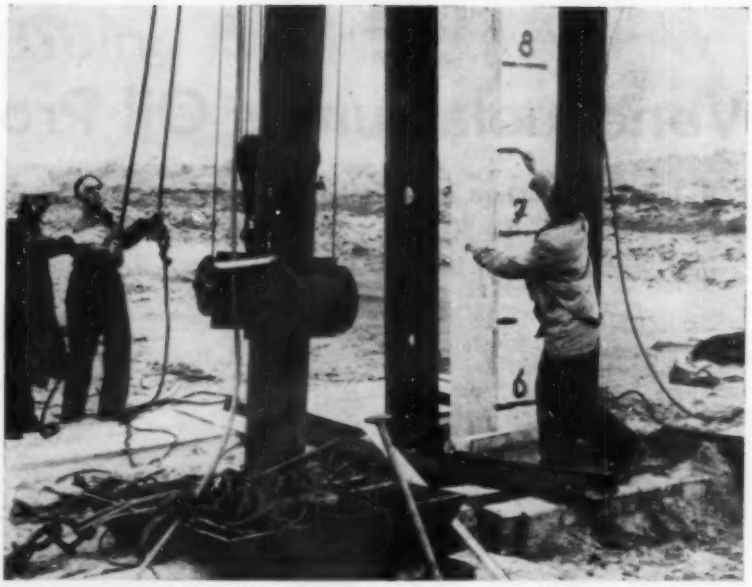
Venezuela has collected just about 57% of the profit from its oil and left the companies with 43% since the principle was first used in 1943.

The split varies from year to year and pretty widely as far as individual companies are concerned, but that has been the 15-year average.

The average includes, as part of the government's share, the $765 million in bonuses paid by oil companies for new concessions in the 15-year period. If the bonuses are excluded, the division is still in favor of Venezuela.

In the 1943-57 period, Venezuela's oil income (including the $765 million in bonuses) was just about $6.6 billion. In the same period the oil companies operating in the country showed a total net income of $5.3 billion.

Last year, Venezuela's oil income was $1,267,599,000, including $389 million for new concessions. In 1957, the industry as a whole showed a net income of $854,385,000.



Work Starts on Rotterdam Refinery

THE FIRST PILING has been driven for the new $50-million Esso Nederland N.V. refinery in Rotterdam.

Completion of the 95,000-bbl. plant is scheduled in 1960. Located in Rotterdam's Botlek area, it will supplement the supply from Esso's refinery in Antwerp. Contractor for engineering and construction is Badger-Comprimo N.V. of The Hague. The firm is owned jointly by Badger Manufacturing Co. Cambridge, Mass., and Comprimo N.V., Armsterdam.

The refinery will have a mile of waterfront facilities, including piers capable of loading three supertankers at once, and loading stations for trucks and tankcars.

It will be one of the first integrated refineries on the Continent to be electronically controlled. It can be converted to complete automation in the future.

Egypt Will Return Properties

. . . seized from Anglo-Egyptian if company-government pact goes into effect. A new concession may be included.

ANGLO-EGYPTIAN Oilfields and the Egyptian Government are burying the hatchet, and reports from Cairo indicate the company is coming up with a new concession.

The company's producing fields and its 44,000-bbl. Suez refinery were sequestered by Nasser 2 years ago in retaliation for the invasion of Egypt by British forces. The properties have been operated by Egyptians ever since.

But John L. Loudon, managing director of Royal Dutch-Shell, and the UAR minister of finance and economy have initiated a draft agreement covering past differences and future operating conditions for Anglo-Egyptian and Shell Oil of Egypt. Royal Dutch is 31% owner of Anglo-Egyptian.

The agreement will take effect when there is a settlement of outstanding questions between the British and Egyptian Governments. This would include the return of the companies to their owners.

Cairo sources say a new exploration concession will be a key part of the company-government agreement. Concession payments would replace government funds now used to subsidize low product prices. Since Egypt started handling a large share of domestic marketing, it has been paying $8½ million per year to make up for the loss it takes on its own price controls.

Anglo-Egyptian's Ras Gharif and Hurghada fields produce a total of 20,000 bbl. daily. Three other fields owned jointly with Socony Mobil total 6,500 bbl. daily.

EQUIPPED with a new electronic system, this DC-3 was used in a magnetic survey over Libyan concessions.

Radan=Push-Button Aerial Surveys

- New system is used in the Sahara. Company says costs cut in half.

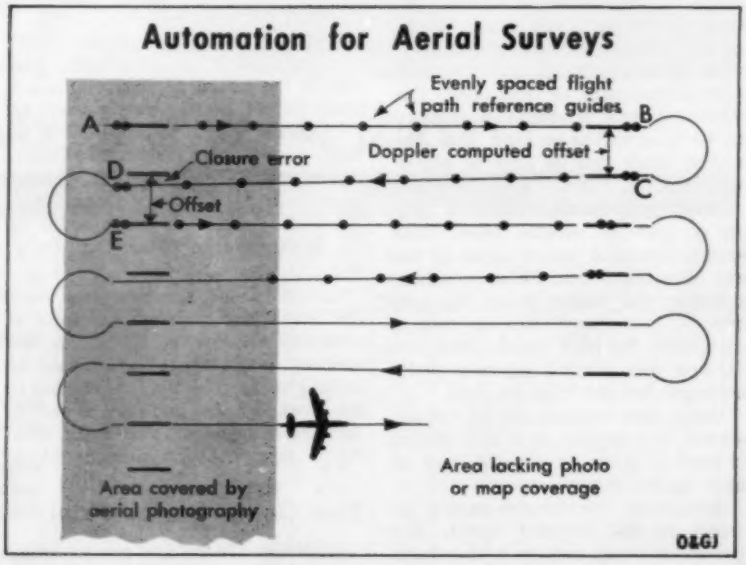
A NEW NAVIGATION tool in the kit of aerial surveyors almost fits the old box camera slogan—you push the button, and it does the rest.

The device is Radan. It permits aerial surveys over areas previously considered too difficult, if not impossible. It guides the survey plane over jungle, desert, muskeg, or water without the need of ground stations.

Just know the position of the take-off strip, and the course to be followed. Radan does the rest. The system is a commercial version of military navigational systems. It has just had its first tryout in an airborne geophysical survey.

Aero Service Corp. used the device in a magnetic survey over 40,000 sq. miles in the Sahara Desert of southern Libya, on concessions held by Pan American International Oil Co. (Indiana Standard). Aero Service liked the results. It thinks Radan, and other gear utilizing the same principle, will lead to a "fairly rapid revolution in aerial-survey techniques."

The company is already starting the second survey using Radan. It will cover 15,000 sq. miles in southwestern Morocco held under concession by AGIP. Much of the area is unmapped and unphotographed.



FLYING a grid of parallel lines is easy with the Radan system. The plane is brought to the starting point (A) electronically. The pilot flies from A to B manually along reference guides, with instruments recording any discrepancies. Radan guides the turn from B to C electronically. Any offset discrepancy (such as D), is noted and recorded electronically. Radan puts the plane back on the computed offset (E).

Here are some Radan advantages:

... **Reconnaissance** lines over unexplored country will be as dependable and technically excellent as lines flown in well-mapped areas.

... **Costs are** between $1 and $2 per line mile, in contrast to other methods of radio guidance which may range from $10 to $20 per line mile, depending on area, extent, and system used. Over-all survey costs are reduced 50% or more.

... **Magnetic surveys** can be made before or during the mapping pro-

gram, avoiding the usual delay for completion of aerial photography.

How it works . . . The system installed in an Aero Service DC-3 was designed and made by General Precision Laboratory, Inc., Pleasantville, N. Y.

The basic equipment includes a course and distance computer, a Kearfott J-4 compass, and a special precision computer to guide and track the aircraft on survey missions.

The equipment employs the Doppler principle, which determines direction of a moving object through sound tones. An approaching object causes a rise in pitch, while a departing object declines in tone.

In the Radan system, four radar signals are sent to the ground, two forward and two aft. The frequency of the transmitted and returned waves is computed and translated into ground speed and drift. Ground distances in most cases can be measured to an accuracy of 1 part in 1,000. Drift is noted within an accuracy of 0.1°. A compass reading plus the drift angle gives the course.

The actual track angle of the plane is constantly compared with the predetermined flight pattern set into the computer. The difference between the actual course and desired course shows up on a dial, which guides the pilot.

No pilot is perfect, and the computer keeps track of deviations. The off-course error is always in front of the pilot, as well as on tape. Thus, the over-all error can be kept to practically zero.

Most aerial surveys consist of flying a grid of parallel lines. With Radan, the pilot gets a signal at the end of a flight line. He then presses a button and Radan guides the turn into the next line. When the turn is completed, the pilot settles down into the new line, parallel and at a predetermined distance from the first.

Since most surveys are far too extensive to complete in 1 day, Radan is used to guide an aircraft from its base to the survey area.

Roughness of terrain causes no errors in the Doppler signal. But bodies of water can be a drawback. Information from moving sea water can considerably lower the accuracy of results. Glass-smooth water may cause the signal to fail temporarily. This is not a problem because the system goes on a memory circuit when the signal fails.

Aero Service is now winding up results of the survey in Philadelphia. Because the lines were flown straight and the intervals exact, compilation is faster without the laborious task of point-by-point visual comparison of photographs.

Libya Getting Rigs

for Oasis operation. Two discoveries already made.

RIGS FROM Egypt and British Somaliland are being pulled into Libya for stepped up drilling by Oasis Oil Co. (Ohio).

A medium-depth rig has already arrived in Tripoli from British Somaliland. It was used in a drilling program which the Conorada group (Continental, Ohio, Amerada) gave up after five dry holes on a 36,000-sq. mile concession in the East Africa country.

The second rig is on its way to Libya from Egypt. It is a heavy outfit used in a $30-million exploration program in the western desert. Four independents gave up the search after spending $30 million. They were Continental, Ohio, Cities Service, and Richfield.

Oasis is the operator for concessions covering 62 million acres held by the Conorada partners. The first rig brought into the country by Oasis is starting its third well on Block 32, where it brought in two discoveries on the first two tries.

The present test is getting under way at Thalith, 5 miles north and west of the Dhara discovery. Dhara 1 tested 38 bbl. of 36°-gravity crude on a 75-minute trial from 3,758-3,808 ft. Bahi 1, 24 miles north of Dhara, earlier tested 75 bbl. of 39°-gravity crude in a 2½-hour test from 5,822-5,854 ft. Bahi is 75 miles south of the Mediterranean (OGJ, Oct. 20, p. 66).

Locations for the new rigs have not been fixed. Because basement is relatively shallow in Block 32, the medium outfit may be assigned to drilling there. The rig now drilling in the block is heavy and may be sent to another concession. The outfit from Egypt may drill on another block.

Esso Opens English Plant

A NEW $28-million petrochemical plant has been opened by Esso Petroleum at its refinery at Fawley, England.

The plant gives a healthy boost to the country's petrochemical industry. It will produce about 40,000 tons per year of ethylene, 42,000 tons of butadiene, and 18,000 tons of pentenes. Production of sulfur at Fawley will be raised to 28,000 tons per year.

The ethylene will be delivered to two customers building nearby plants. Monsanto will produce polyethylenes. Union Carbide (Gemec Ltd.) will produce ethylene oxide and derivatives. The butadiene will be sold to International Synthetic Rubber Ltd., which has just opened a new plant. Pentenes will be delivered to Imperial Chemical Industries to be used in the manufacture of higher alcohols.

Petrochemical Deal

proposed by Fish company for Argentine Government.

FINAL DRAFT of a proposal for a $40-million petrochemical complex near Buenos Aires was to be submitted to the Argentine Government shortly by a U. S. company.

Fish Engineering Corp. already has made a tentative offer, and the government reportedly has indicated interest. The final draft was expected to be in President Frondizi's hands by this week.

Fish did not disclose details of the proposal except to say there are other U. S. partners in the deal, and that the complex would be privately owned and operated. Eventually it would revert to the Argentine Government.

The proposed complex would fit into Fish's current project to lay $180 million in pipelines from northern Argentina's production area to the capital city.

A Fish-affiliated company recently started construction of a 580-mile crude-oil line and a 1,015-mile natural-gas line to tie Argentina's production with the principal area of population (OGJ, Sept. 8, p. 83). Construction is scheduled to be completed by 1961.

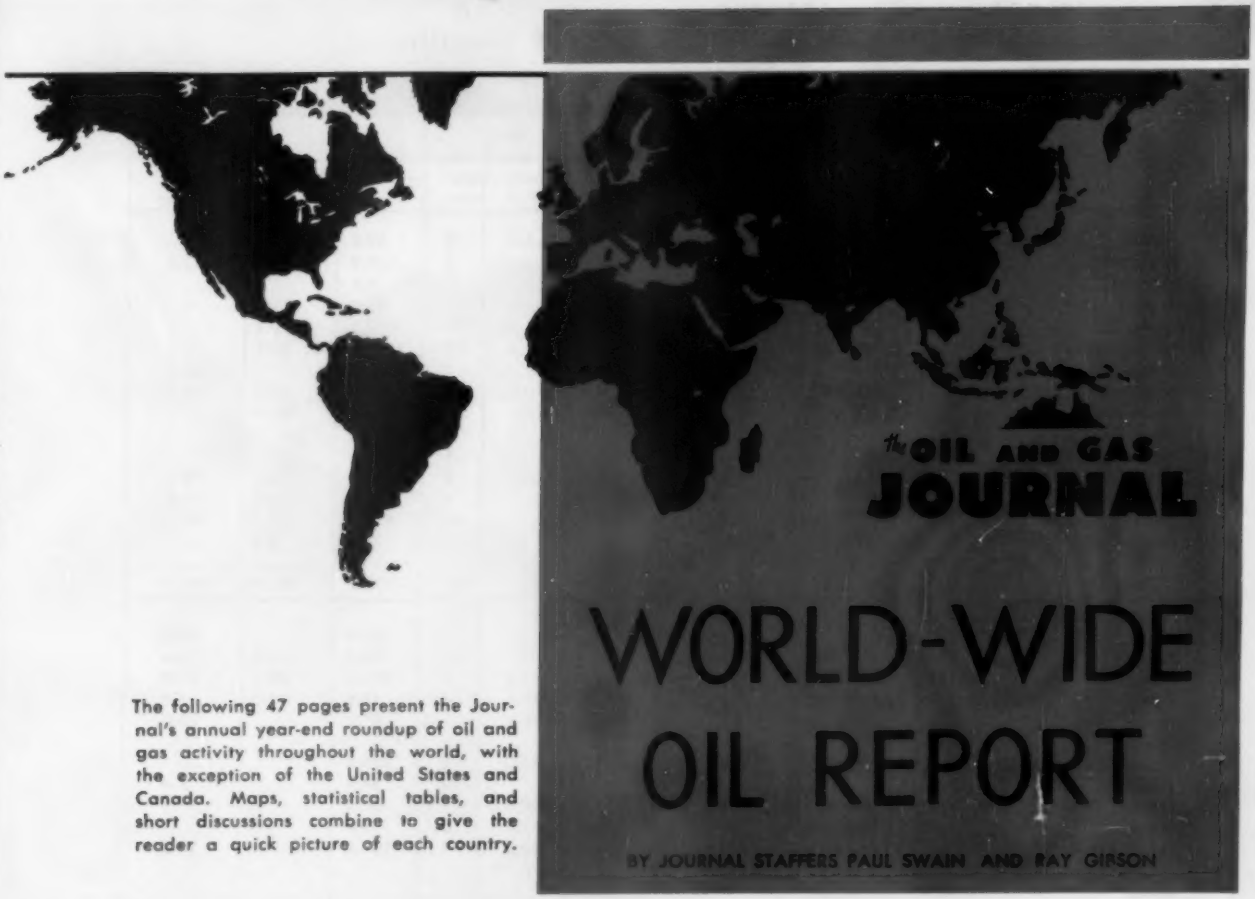
The proposed petrochemical complex would be at the terminus of one of these lines.

Costly Test Going Deeper

ONE of the most expensive wildcats ever budgeted is drilling ahead past its planned objective.

The well, an offshore test on Cay Sal bank in the Bahamas, is drilling at 15,131 ft. California Standard and Gulf Oil have kept a tight lid on information about the test. But they had planned to spend nearly $3 million for a projected 15,000-ft. well when the test was spudded in the spring (OGJ, March 24, p. 108).

The site is 40 miles northeast of Cardenas on Cuba's north coast, and 187 miles southwest of Nassau. Bahama California Oil is the operator on a 1,933-sq.-mile license. The well has been sidetracked twice, and is now making hole with a 12¼-in. bit.



The following 47 pages present the Journal's annual year-end roundup of oil and gas activity throughout the world, with the exception of the United States and Canada. Maps, statistical tables, and short discussions combine to give the reader a quick picture of each country.

SUMMARY OF JOURNAL SURVEY

COUNTRY	Page No.	RESERVES Proved bbl. (1,000's)	WELLS Producing 7-1-58	WELLS Drilling 12-1-58	PRODUCTION Daily 1958 (1,000's)	PRODUCTION Per cent change from 1957	REFINING No. oper. refrs.	REFINING 1,000 bbl. daily Crude	REFINING 1,000 bbl. daily Cracking	REFINING 1,000 bbl. daily Reforming
Argentina	90	1,000,000	3,360	70	94.3	5.1	15	221.5	104.7	3.0
Bahamas	104			1						
Barbados	105			1						
Bolivia	91	90,000	102	16	9.1	—7.2	4	12.3		
Brazil	92	250,000	203	30	57.2	146.6	8	152.8	62.6	12.0
British Honduras	104			1						
Colombia	93	700,000	2,133	22	132.1	6.0	5	73.4	60.7	
Chile	92	50,000	92	4	14.9	26.2	1	24.0	9.5	4.0
Cuba	94	3,000	229	3	1.0	—9.1	6	88.4	35.1	5.9
Dominican Republic	105			1						
Ecuador	95	25,000	1,695	3	9.0	12.5	3	5.8		
Guatemala	104			1						
Mexico	96	2,500,000	2,247	110	243.1	0.8	8	447.0	55.0	
Netherlands West Indies	105						2	650.0	503.0	20.0
Panama	105			1						
Peru	98	325,000	3,250	13	54.3	4.4	3	49.2	15.2	
Puerto Rico	105						2	77.5	66.7	7.5
Trinidad	99	400,000	3,128	33	99.2	9.7	3	158.5	64.5	8.0
Uruguay	98						1	28.0	2.0	
Venezuela	100	16,500,000	9,198	83	2,514.8	—13.3	13	820.1	143.1	19.4
United States		33,000,000	574,170	3,300	6,459.3	—9.8	311	9,955.0	6,466.4	2,103.4
Canada		4,000,000	12,669	200	450.0	—9.0	45	872.0	503.2	156.1
Total		58,843,000	612,476	3,893	10,138.3		430	13,635.5	8,091.7	2,339.3

(Table continued on next page)

SUMMARY OF JOURNAL SURVEY (Continued)

COUNTRY	Page No.	RESERVES Proved bbl. (1,000's)	WELLS Producing 7-1-58	WELLS Drilling 12-1-58	PRODUCTION Daily 1958 (1,000's)	PRODUCTION Per cent change from 1957	REFINING No. oper. refrs.	REFINING 1,000 bbl. daily Crude	REFINING 1,000 bbl. daily Cracking	REFINING 1,000 bbl. daily Reforming
Austria	105	300,000	801	19	56.6	—5.7	9	49.3	11.0	.....
Belgium	107	.....	.....	.....	.....	.....	8	175.9	25.1	32.0
Denmark	115	.....	.....	1	.....	.....	3	0.6	.....	.....
Finland	115	.....	.....	.....	.....	.....	1	23.0	12.8	3.4
France	108	175,000	445	50	28.3	1.8	13	713.2	149.4	127.1
West Germany	109	420,000	3,386	140	86.8	13.8	25	406.5	88.1	65.5
Greece	111	.....	.....	.....	.....	.....	1	30.0	.....	8.2
Italy (incl. Sicily)	112	300,000	92	36	28.3	16.5	36	722.9	56.8	122.6
Netherlands	113	200,000	340	3	29.6	11.7	2	349.0	95.0	37.7
Norway	115	.....	.....	.....	.....	.....	1	2.0	.....	.....
Portugal	114	.....	.....	1	.....	.....	1	22.9	10.6	.....
Spain	114	.....	.....	3	.....	.....	3	144.7	3.5	25.0
Sweden	115	.....	.....	.....	.....	.....	4	47.8	1.0	11.8
United Kingdom	115	7,000	242	4	1.6	.....	14	917.9	137.3	107.9
Yugoslavia	...	35,000	200	15	8.6	6.2	3	27.5	6.4	.....
Total		1,437,000	5,506	272	239.8	.....	124	3,633.2	597.0	541.2
Aden	123	.....	.....	.....	.....	.....	1	120.0	.....	12.0
Bahrain	118	230,000	147	1	40.6	24.9	1	186.5	63.3	10.4
Iran	118	33,000,000	88	8	808.2	11.4	3	493.0	35.0	81.0
Iraq	119	25,000,000	82	8	756.2	71.7	6	55.8	15.0	10.0
Israel	119	50,000	20	6	2.0	66.6	1	87.0	.....	20.0
Jordan	123	.....	.....	1	.....	.....	...	.....	.....	.....
Kuwait	120	60,000,000	276	6	1,376.0	24.0	2	220.0	.....	.....
Lebanon	123	.....	.....	.....	.....	.....	2	24.0	.....	1.4
Neutral Zone	121	6,000,000	82	5	84.1	29.4	1	50.0	.....	.....
Qatar	122	2,500,000	40	1	162.0	19.0	1	0.6	.....	.....
Saudi Arabia	122	47,000,000	194	3	991.3	10.9	1	189.0	.....	41.5
Southern Arabia	123	100,000	.....	3	.....	.....	...	.....	.....	.....
Syria	123	1,000	.....	2	.....	.....	...	.....	.....	.....
Turkey	124	70,000	32	5	6.5	6.5	1	6.9	3.0	.....
Total		173,951,000	961	49	4,226.9	.....	20	1,432.8	116.3	176.3
Australia	124	1,000	.....	4	.....	.....	7	212.2	57.5	27.2
British Borneo	125	500,000	480	2	104.6	—10.1	1	44.0	.....	.....
Burma	125	45,000	231	3	10.5	61.5	2	9.4	.....	.....
Formosa (Taiwan)	126	500	57	2	0.04	—9.3	1	28.0	14.0	2.5
India	126	500,000	581	5	9.0	—2.2	4	110.0	29.6	10.5
Indonesia	127	8,500,000	1,472	16	350.0	12.9	5	248.8	64.0	15.0
Japan	128	50,000	2,291	15	6.8	11.4	25	553.2	52.0	27.4
New Guinea	129	30,000	37	1	4.9	—24.6	...	.....	.....	.....
Pakistan	130	20,000	.....	6	5.4	—6.9	1	6.0	.....	.....
Philippines	130	.....	.....	2	.....	.....	1	18.0	7.5	.....
Total		9,646,500	5,149	56	491.24	.....	47	1,229.6	224.6	82.6
Algeria (incl. Sahara)	130	3,500,000	22	38	10.0	4,900.0	...	.....	.....	.....
Angola	134	25,000	14	2	1.9	1,065.0	1	2.2	.....	.....
East Africa	132	.....	.....	7	.....	.....	...	.....	.....	.....
Egypt	132	400,000	206	5	65.2	53.4	3	74.7	9.2	3.7
French West Africa	134	.....	.....	3	.....	.....	...	.....	.....	.....
Gabon	134	100,000	63	8	8.1	131.4	...	.....	.....	.....
Libya	133	50,000	.....	8	.....	.....	...	.....	.....	.....
Morocco	133	8,500	88	2	1.5	0.8	1	2.1	1.8	.....
Moyen Congo	134	10,000	.....	2	.....	.....	...	.....	.....	.....
Nigeria	134	25,000	10	6	4.4	.....	...	.....	.....	.....
South Africa	133	.....	.....	.....	.....	.....	1	21.1	10.0	2.0
Tunisia	133	.....	.....	2	.....	.....	...	.....	.....	.....
Total		4,118,500	403	83	91.1	.....	6	100.1	21.0	5.7
Total Free World		247,996,000	624,495	4,353	15,187.34	.....	627	20,031.2	9,050.6	3,145.1
Russia and controlled areas		*27,705,000	.....	.....	2,525	15.3	...	.....	.....	.....

*Includes (thousands of barrels) USSR, 26,000,000; Romania, 1,000,000; Hungary, 150,000; Albania, 20,000; China, 500,000; Czechoslovakia, 15,000, and Poland, 20,000.

CENTRAL AND SOUTH AMERICA

PRODUCTION AND REFINING CAPACITY

(Barrels per day)

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
Argentina	94,300	221,550
Bolivia	9,075	12,300
Brazil	52,249	152,800
Chile	14,875	24,000
Colombia	132,171	73,400
Cuba	961	88,400
Ecuador	9,042	5,795
Mexico	243,116	447,000
Neth. W. Indies		650,000
Peru	54,342	49,200
Puerto Rico		77,500
Trinidad	99,290	158,500
Uruguay		28,000
Venezuela	2,514,799	820,100

LEGEND

- OIL FIELDS
- GAS FIELDS
- OIL LINES UNDER CONST.
- OIL PIPELINES
- GAS LINES UNDER CONST.
- GAS PIPELINES
- REFINERIES
- EXPLORATION ACTIVITY

Abbreviations used in the tabulations with this report

Cracking Processes:

FCC—Fluid cat cracking
TCC—Thermofor cat cacking
HD—Houdriflow cat cracking
Vis—Visbreaking
Plf—Polyforming

Other Processing:

A—Asphalt
Alky—Alkylation
BPH—BP Hydrofining
Cat—Atlantic Catforming
CH—Catalytic hydrodesulfurization
CR—Cat reforming
Fhy—Fluid Hydroforming
H—Hydrogenation
HF—Houdriforming
Hyd—Esso Hydrofining
Is—Butane isomerization
L—Lube manufacture
PD—Perco desulfurization
Pf—UOP Platforming
Poly—Polymerization
Pwr.—Esso Powerforming
Sf—Socony
C—Coke
T—Thermal Reforming
SB—Sinclair-Baker
Un—UOP Unifining
V—Vacuum distillation

ARGENTINA

THE Argentine Government has climaxed its program to bring in foreign help to develop its oil industry by signing contracts with Royal Dutch-Shell and Jersey Standard calling for a $100,000,000 expenditure over the next 10 years.

While the deals were not the biggest, nor did they technically grant concessions, they still mark the first new exploration agreement with international companies since oil was nationalized in the 1930's. Both Jersey and Shell have declining production from old concession areas.

Shell will carry on an exploration and develop-

ARGENTINA PRODUCTION

Chubut Province

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Comodoro Rivadavia, 1925	2,900-6,900	....	438	7,799	97,575,007	24.5
Neuquen Province						
Dadin, 1924	2,575	....	23	163	.....	32.5
Huincul, 1923	2,618	4	34	158	.....	29.2
Salta Province						
Agua Blanca, 1926	3,041	....	....	36	.....	22.5
Cerro Tartagal, 1927	3,953	....	1	17	.....	45.0
Lomitas, 1927	2,185	....	18	89	.....	43.0
Ramos, 1928	3,927	....	2	3	.....	54.0
San Pedro, 1928	3,117	....	16	296	.....	43.0
Total		*4	*532	†94,300	‡657,188,136	

*Includes only private-company data. †Includes Y.P.F. production totals. ‡For last 8 years only.

ARGENTINA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Cia. Condor, Avellaneda	900	.....	.....	.....	.....
Cia. La Isura, S.A., Bahia Blanca	2,000	.....	.....	.....	.....
Diadema Argentina, S.A. de Petroleo, Buenos Aires	23,000	26,000	.....	3,000 T	.....
Esso, S.A. Petrolera Argentina:					
Bahia Blanca	10,500	3,000 5,000 Vis	.....	.....	.....
Campana	[1]38,900	17,500 Vis	.....	.....	8,000 V, 1,100 L, 2,100 A
Dadin (Plaza Huincul)	470	.....	.....	.....	.....
Manuel Elordi	1,580	.....	.....	.....	.....
Lottero y Papini-Avellaneda	700	.....	.....	.....	320 V, 280 L
Yacimientos Petroliferos Fiscales:					
Avellaneda	6,000	2,500			
La Plata	[2]95,000	7,000	18,400 FCC	.....	.....
Lujan de Cuyo	[3]12,000	9,000	.....	.....	.....
Plaza Huincul	2,500	1,000	.....	.....	.....
Comodoro Rivadavia	5,500	2,000	.....	.....	.....
Salta	2,500	1,300	.....	.....	.....
San Lorenzo	20,000	12,000	.....	.....	.....
Total	221,550	86,300	18,400	3,000	

(1) Adding 13,700-bbl. crude unit and 10,000-bbl. fluid cat cracker. (2) Plan to add 28,000-bbl. crude capacity. (3) Plan increase to 26,000-bbl. capacity.

ment program on an 11,500-sq.-mile area on the East Coast in the vicinity of Bahia Blanca. If oil is found, expenses will be paid off in crude, with remaining output split 50-50 by Shell and Y.P.F., the government company.

Jersey will carry on a program on 1,185,000 acres in Neuquen. It will be paid in pesos, convertible to dollars, on a sliding scale, working down to the equivalent of $1.74½ per barrel for output over 25,000 bbl. daily. In contracts signed earlier, Pan American International (Indiana Standard) will spend $60,000,000 in the Comodoro Rivadavia area. Carl M. Loeb, Rhoades & Co., New York investment banking firm, will spend $100,000,000 in established fields.

There were signs that political foes of President Arturo Frondizi were trying to rally internal opposition to the contracts in an effort to overthrow his government. But Dr. Frondizi appeared to be in firm control after heading off a threatened nationwide strike by Y.P.F. employes. The unrest, however, may have killed the chances of the biggest proposal of all, an $800,000,000 drilling and pipeline construction contract with a group of U. S. firms controlled by Floyd Odlum and Williams Brothers.

Argentina also accepted an offer to barter for oilfield and exploration equipment from Russia. It will buy up to $100,000,000 worth of gear in exchange for wool, hides, and other raw materials.

BOLIVIA

SMALL AMOUNTS of Bolivian crude are reaching tidewater for the first time with the opening of a 217-mile, 8 and 10-in. pipeline from Sicasica, Bolivia, to Arica, Chile, on the Pacific Coast.

The line crosses the Andes Mountains and is the last leg of an 800-mile system carrying crude from Camiri field in South Central Bolivia. The extension to Arica will move 6,000 bbl. daily to the coast for export. The older part of the system in addition to the new load will continue to supply several topping-plant refineries along the route. These make Bolivia self-sufficient for most products.

The pipeline, refineries, and existing production in the country are owned by the government monopoly, Y.P.F.B. Exploration by private companies is picking up, however, as the result of a liberalized oil law which went into effect 3 years ago.

Two American groups are drilling wildcats. Gulf Oil Corp. and three Tulsa companies have had good shows at 5,916 ft. in Mandeyapecua, located 90 miles north of the Argentine border. Chaco Petroleum, a subsidiary of Tennessee Gas Transmission, is drilling a well on a concession once held by Glenn McCarthy. The rights are held by Tennessee Gas Transmission Co., Union Oil & Gas, Lion Oil Co., and Murphy Corp.

Preliminary work is under way on the Madrejones concession on the Argentine border, which was acquired this year by Fish Engineering Corp. A Drilling & Exploration subsidiary has started exploring on acreage it holds in Zone 1. Other concession holders in Bolivia include Royal Dutch-Shell, Cataract Mining, White Eagle, California Standard, and Andes Oil, owned jointly by Pure Oil Co., Hancock Oil Corp., and Sohio.

Several private Brazilian firms are bidding for a concession on a 5,800-sq.-mile tract reserved for Brazil in payment for a railroad built 20 years ago. The Bolivian oil law excludes development of the area by Petrobras, the Brazilian government agency. One bidder, Petroleo da Bolivia, has signed a tentative agreement with two Tulsa firms for exploration and drilling. The contracts will become effective if Petroleo gets the acreage.

BOLIVIA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping	Daily	Cumulative	
Bermejo, 1924	3,608	7	6	1,138	2,259,063	26-27
Camiri, 1927	4,528	44	12	7,842	15,791,891	56-59
Guairuy, 1947*	2,788	11	...	...	...	54-59
Sanandita, 1926	3,116	...	12	95	2,096,762	42
Toro, 1955†	4,100	10	...	...	...	21-54
Total		72	30	9,075	20,147,716	

*Production included in Camiri figures. †Production included in Bermejo figures.

BOLIVIA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Yacimientos Petroliferos Fiscales Bolivianos:					
Camiri	2,000	...	...	...	...
Cochabamba	15,800	...	...	...	...
Sanandita	500	...	...	...	...
Sucre	4,000	...	...	...	...
Total	12,300	...	...	...	

(1) 190-bbl.-daily lube plant planned.

BRAZIL

THE 4-YEAR-OLD oil monopoly, Petrobras, is making some headway in its efforts to make Brazil a self-sufficient oil country, but it still has a long row to hoe.

The best progress is being made in the refining industry, where the day is in sight when all domestic needs will be filled by local plants. Brazilian refineries now are supplying about 60% of demand, and by 1961 capacity will be pushed above the 300,000-bbl. mark. A contract has been awarded for a key plant in the expansion, a 90,000-bbl.-daily plant at Caxias, near Rio de Janeiro.

Progress is slower in the producing side of the industry, where crude output still covers only about one-fifth of demand. Production has grown to 56,000 bbl. daily from established fields in Bahia. The gains, however, are offset by growing consumption. Petrobras' target is 100,000 bbl. daily by 1961.

The agency is spending $150,000,000 out of a budget of $430,000,000 for exploration. Work is concentrated in the Amazon Valley, where about 10 wildcats are drilling at any given time.

There is discussion in Brazil over following Argentina's lead in awarding development contracts to foreign companies. But Petrobras stoutly opposes any foreign help on this basis. A barter deal has been made with Russia under which Brazil will get crude in exchange for coffee. Some of Petrobras' own production is exported because it is of waxy, high-quality type good for lubricating oil. Profits on the sale of 20,000 bbl. daily are used to buy less expensive crude.

BRAZIL PRODUCTION

Name of field—Discovery date—	depth (ft.)	No. of wells* Flowing	No. of wells* Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Agua Grande, 1951	250-1,265	44		32,263	12,289,898	40.2-41.6
Aratu, 1942	460-800				57,222	44.0
Candeias, 1941	692-1,637	60		13,700	11,190,639	29.9-33.0
Dom Joao, 1947	228-315	53	3	2,681	489,504	33.1-37.5
Itaparica, 1942	475-750	18		504	378,233	34.3
Jacuipe, 1956	750					
Lobato-Joanes, 1939	266-570	1		5	85,572	31.0
Mata de Sao Joao, 1951	400-1,196	16	2	2,948	1,234,484	37.9
Pedras, 1950	139-322	3		85	5,029	38.0
Paramirim, 1950	140-1,135	2		63	147,604	38.0
Pitanga, 1945	1,220				411	
Pojuca, 1953	1,400-1,460				19,126	38.4
Sao Pedro, 1957	1,750	1			258	40.5
Total		198	5	†52,249	25,897,980	

*Another 150 wells shut in. †As of July 1. Petrobras reported an additional 5,000-bbl. daily production November 1.

BRAZIL REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking Thermal	Cracking Catalytic	Reforming	Other processing
Cia. de Petroleo da Amazonia, S.A.—					
Manaus	5,000		2,000 FCC		
Destilaria Rio Grandense de Petroleo—					
Uruguaiana	300				
Industrias Mafarazzo de Energia—					
Sao Paulo	500				
"Ipiranga" S.A., Rio Grande do Sul—					
Petrobras, S.A. (Fabrica de Asfalto)—					
Cubatao					3,000 A
Rio Grande	7,000	2,000			60 A
Refineria de Manguinhos, S.A.—					
Rio de Janeiro	10,000	3,900			
		4,500 Vis			
Refineria Uniao, S.A.—Capuava	30,000		35,000 TCC		8,000 V, 1,000 Poly
Petrobras, S.A.:					
Cubatao	90,000	12,000		12,000 T	3,000 A
Mataripe	[1]10,000	750 Vis			
		2,500			
Rio de Janeiro	(2)				
Total	152,800	25,650	37,000	12,000	

(1) Adding 42,000-bbl. crude unit, 18,500-bbl. vacuum unit, 12,000 FCC unit, 2,800-bbl. lube capacity. (2) Building 90,000-bbl. refinery including 45,000-bbl. vacuum unit, 21,300-bbl. FCC unit, 11,800-bbl. Hydroformer, 5,000-bbl. Esso Hydrofiner, and 3,500-bbl. alkylation unit.

CHILE

CHILE'S government-run oil industry continued to make small production gains from fields in Tierra del Fuego, with output nearing 16,000 bbl. daily late in the year. Refining capacity at the country's only plant, at Concon, is being doubled, and Empresa Nacional del Petroleo has awarded a construction contract to M. W. Kellogg Co. Capacity is being raised from 24,000 bbl. to 48,000 bbl. daily. A pipeline carrying Bolivian crude across the Andes Mountains to the Pacific Coast terminates at Arica, a Chilean port. Initial deliveries through the 217-mile, 8 and 10-in. line are starting.

CHILE PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Albatros, 1957	6,300	1	....	144	26,064	63
Calafate, 1956	6,000	6	1	474	253,994	46
Catalina, 1956	5,900	3	....	121	21,901	66
Chanarcillo, 1950	7,600	4	....	549	837,518	46
Chanarcillo, Sur, 1952	7,500	2	....	140	205,152	46
Chillan, 1953	7,600	11	....	1,207	1,538,686	41
Cullen, 1954	6,000	19	....	5,311	2,145,092	42
Delgado, 1952	7,600	....	....	....	1,567	39
Espora, 1949	7,500	....	....	....	4,489	46
Flamenco, 1954	6,500	7	....	314	213,759	42
Gaviota, 1957	7,200	2	....	301	54,481	42
Lautaro, 1957	8,300	2	....	257	46,517	40
Manantiales, 1945	7,500	4	....	175	1,399,908	42
Manantiales, Sur., 1955	7,800	....	....	....	6,300	....
Sombrero, 1950	7,500	12	....	2,775	5,230,256	42
Sombrero, Norte, 1954	7,250	....	....	....	2,296	42
Tres Lagos, 1957	5,800	3	....	402	72,762	39
Vertientes, 1956	7,500	2	....	371	159,432	61
Victoria, Este, 1954	7,500	4	....	545	603,280	46
Victoria, Norte, 1950	7,600	2	....	339	528,899	42
Victoria, Sur, 1950	7,500	9	....	1,450	2,847,130	42
Total		91	1	14,875	16,199,483	

CHILE REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Empresa Nacional del Petroleo, Concon	[1]24,000	4,500 5,000 Vis	.....	4,000 T	.....
Total	24,000	9,500	.....	4,000	

(1) Building 24,000-bbl. crude unit, 10,080-bbl. vacuum unit, 12,000-bbl. Fluid cat cracker, 6,000-bbl. SBK cat reformer, 1,100-bbl. sulfuric acid MWK alkylation unit.

COLOMBIA

DESPITE its snail's pace, Colombian crude production has risen past the 130,000-bbl.-daily mark for the highest level in history.

The upper and middle valley of the Magdalena River, and the Barco concession along the Venezuelan frontier still are the main sources of crude. Among

COLOMBIA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Buturama, 1953	6,000	2	1	80	408,186	38.4
Caipal-Ermitano, 1955	5,600	1	5	517	162,045	16.0
Campo Yuca, 1957	4,900	....	1	196	5,960	36.6
Cantagallo, 1943	4,525-7,358	6	5	2,126	6,496,403	20.6
Carbonera, 1939	800-1,999	....	2	59	308,668	20.7
Casabe, 1941	2,140-5,660	....	394	25,758	128,873,322	21.1
Cicuco, 1956	8,100	10	....	6,833	1,636,978	43.9
Colorado, 1925	2,800-5,600	6	9	668	1,504,020	30-40
El Dificil, 1943	5,590-5,800	14	....	863	7,097,967	46.1
Galan, 1945	3,000-4,000	14	22	2,588	4,609,712	19-20
Gualanday, 1957	7,700	1	....	(†)	15,201	38.0
Infantas, 1918	600-3,500	1	330	7,792	179,155,327	24-32
Las Garvas, 1957	8,374-8,460	....	....	....	33,690	32.0
La Cira, 1925	900-4,200	1	754	16,809	306,247,580	24-30
Ortega, 1951	5,600	....	2	495	1,724,809	28.1
Palagua, 1954	4,000	15	51	7,961	3,791,477	15.7
Penas Blancas, 1958	5,176-5,780	1	....	71	11,900	31.0
Petrolea (North), 1933	760-1,220	4	5	102	32,494,902	45.0
Petrolea (South), 1937*	1,000	....	....	....	42,178	37.0
Puerto Barco, 1958	7,800	1	....	485	51,331	50.0
Rio de Oro, 1937	1,200-7,900	7	23	2,558	4,717,562	35.8-45.0
Sogamoso, 1957	11,000	2	....	158	42,700	27.6
Sardinata (South), 1950-1957	4,200-9,700	6	11	754	2,054,513	31.6-48.7
Sardinata (North), 1950-1958	5,000-9,700	2	2	444	1,478,839	34.3-48.7
Tetuan, 1950	2,500	....	1	187	263,042	21.4
Tibu, 1942-1957	785-9,700	46	219	21,652	94,123,115	20.9-46.0
Totumal, 1951	7,200	3	....	150	262,120	26.5
Yariqui, 1954	7,190-8,028	7	....	4,351	4,996,575	20.4
Velasquez, 1946	4,700-6,000	48	98	28,514	29,948,681	23.0
Total		198	1,935	132,171	812,558,812	

*Depleted and abandoned. †Well still being tested.

COLOMBIA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Colombian Petroleum Co., Tibu	2,200				
Empresa Colombiana de Petroleos: Barrancabermeja	37,500	16,500 Vis	[1]19,280 FCC		4,700 V., 1,205 Alky, 175 L, 962 A[2]
La Dorada	4,500				
Texas Petroleum Co., Guamo	1,200				
International Petroleum (Colombia), Ltd., Cartagena	28,000		[3]25,000 FCC		17,478 V, 1,660 Poly
Total	73,400	16,500	44,280		

(1) 15,130 bbl. fresh feed. (2) Building additional 1,635 H_2SO_4 alkylation unit and 205-bbl. lube plant. (3) 13,130 bbl. fresh feed.

highlights in this area are gains totaling several thousand barrels daily in Velasquez and Palagua fields operated by Texas Petroleum Co. The decline in the old De Mares concession, which has reverted to the government company, Ecopetrol, has been slowed down by secondary recovery. Forest Oil Corp. is conducting a water-flood project.

Output from Barco fields is slipping. But Colombian Petroleum Co., owned by Socony Mobil Oil Co. and The Texas Co., is offsetting the loss with output from the 2-year-old Cicuco field in lower Magdalena Valley, relatively near the Caribbean Coast. Colpet's No. 12 well in the field came in at 2,880 bbl. daily, after the No. 11 tested at 160 bbl. of oil per day.

One of the wildcatting programs in progress is being run by a newcomer, Cities Service Oil Co. The company has taken over the old Aguas Claras concession where it has two rigs active. Ecopetrol has 25% interest.

Increasing attention is being given the Caribbean Coastal region and the Llanos, which start 550 miles inland. Coastal wildcats are being drilled by Mobil Oil at La Raeda, and by a Sun-Pure-United Carbon group on the Gulf of Uraba. Sun is the operator.

International Petroleum Co. has a stratigraphic rig drilling in the Llanos region at present.

CUBA

CUBAN drilling activity has nosedived because of civil war in parts of the island, and negative results in deep tests drilled by major companies have not helped.

Only three wells now drilling are below 4,000 ft. Texaco Petroleum Co. is at 9,115 ft. in 1 Guayabo in Las Villas Province, and Atlantic Refining Co. is past 4,000 ft. in 1-A Palacios in Pinar del Rio. Siboney-Caribbean Petroleum Co. is down to 8,500 ft. in G-1-A Siboney-Cacique, in a project to deepen a well bottomed near 7,000 ft. 2 years ago. Cuban Stanolind is withdrawing from the island altogether.

Major companies wound up a round of refinery construction last year.

CUBA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Bacuranao-Cruz Verde, 1955	1,000-1,300		19	118	*308,487	28.0
Catalina, 1956	7,000		1	12	17,919	32.0
Guanabo, 1956	1,400-2,200		3	97	52,566	8.0-11.0
Jarahueca, 1943	500-3,000		6	65	1,240,377	38-40
Jatibonico, 1954	1,100-1,300		21	630	1,088,190	15-16
Motembo, 1885	400-1,700		†174	10	1,807,289	60-62
Santa Maria, 1955	2,200-6,000		5	29	78,059	16-28
Total			229	961	4,592,887	

*Includes production of old Bacuranao field now abandoned. †Production by bailing stripper wells.

CUBA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Bacuranao Refining Co., Bacuranao	300				
Copetrol Oil Refining Co., Nuevitas, Camaguey	(1)				
Cia. Petrolera Shell de Cuba, Havana	28,500		10,600 FCC		
Esso Standard Oil Co., S.A., Belot	36,500		24,000 FCC	2,600 Pwr	2,400 Hyd, 1,300 Poly, 1,000 A
Refineria Cabaiguan, S.A., Cabaiguan	[2]2,500	500			
Santa Maria Oil Refining Co., Havana	600				
The Texas Co. (West Indies), Ltd., Santiago de Cuba	20,000			3,300 Pf	4,100 CH
Total	88,400	500	34,600	5,900	

(1) 18,000-bbl. refinery planned. (2) Company plans new 3,000-bbl. plant later to be increased to 5,000 bbl. at Cienfuegos, Las Villas. When completed Cabaiguan plant will be dismantled.

ECUADOR

OIL OPERATIONS have slowed way down in Ecuador because of an impasse between the government and the largest operator over product prices and taxes.

Anglo-Ecuadorian Oilfields, Ltd., suspended work on a new 7,700-bbl. refinery at La Libertad on the grounds that it loses money on marketing. The plant is to replace an existing 5,000-bbl. refinery. But if it had opened, it would have taken crude which is now exported and is yielding a profit to the company.

The company also has scaled down its spending in field operations, and footage is down in properties which supply 90% of local production. Manabi Exploration, the other crude producer, suspended drilling after a wildcat labor strike last year.

Tennessee Gas Transmission Co. has acquired a 1,445,000-acre concession in West-Central Ecuador north of Guayaquil.

ECUADOR PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping*	Production in bbl.—Daily†	Production in bbl.—Cumulative	Gravity °API
Ancon, 1921	400-5,000	41	1,353	6,764	58,491,642	37-38
Carolina Santa Paula, 1934	495	23	50	595	2,672,859	27-28
Cautivo-Tigre, 1920	500-3,500	25	150	1,393	9,456,604	37-38
Concepcion, 1931	4,000	4	28	161	1,447,655	
Petropolis-San Marcos, 1937	.....	.....	21	129	1,410,565	29-30
Total		93	1,602	9,042	73,497,325	

*Includes all artificial lift. †Daily average first 6 months.

ECUADOR REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Anglo-Equadorian Oilfields, Ltd.:					
La Libertad[1]	5,000	.....	.....	.....	.....
Santa Elena	625	.....	.....	.....	.....
Santiago Petroleum Co., Cautivo	1,700	.....	.....	.....	.....
Total	5,795	.....	.....	.....	

(1) Company has halted work on almost completed 7,700-bbl. refinery with 6,000-bbl. thermal cracker in dispute with government over depressed level of controlled product prices.

MEXICO

PEMEX after 20 years has made Mexico a self-sufficient oil country, but the government monopoly still is married to low product prices which prevents it from getting needed capital for expansion.

There have been 120 rigs on exploration and development drilling, and two new oil fields were brought in this year. Xiliapa is in the Poza Rica area, and Mecoacan in the Isthmus region. A gas discovery was made in the northeast zone at Santa Anita. Fifty survey parties have been working on seismic, gravity, and geology, with crews fairly evenly divided among five basins.

Refinery runs now exceed demand, even though some products for economic reasons are imported from California. Among the new facilities which are going on stream are a 55,000-bbl. vacuum-distillation unit, and a 25,000 to 35,000-bbl. catalytic cracker at Atzcapotzalco near Mexico City. A 7,000-bbl. crude unit and a 4,000-bbl. vacuum unit are going on stream at Minatitlan. The prize program is a $40,000,000 modernization at Mandaro, which is scheduled to be completed in 1960.

Some of the best progress is being made with natural gas. When a 491-mile, 24-in. pipeline is completed to Mexico City from Ciudad Pemex in the Isthmus of Tehuantepec, industry will convert from fuel oil to gas. This will release fuel oil for conversion to gasoline and other light products, and the cracker at Atzcapotzalco is being built for this purpose.

The Reynosa area has taken the lead as the main gas-producing area, with output earlier in the year varying from 258 to 281 million cubic feet daily. Export deliveries from Reynosa to Texas Eastern Transmission Corp. the first 6 months averaged 134 million cubic feet daily.

Two private firms are engaged in offshore work under special contracts with Pemex. A group including Edwin W. Pauley, American independent, and a Petrofina affiliate started a program along Veracruz and Tabasco. An affiliate of Sharples Oil Corp. has been looking for an extension of the Golden Lane in Tamiahua lagoon, near Tampico.

Sen. Antonio J. Bermudez, who was credited with creating a working oil industry in Mexico in the 12 years he served as head of Pemex, left the job near the end of the year when incoming President Adolfo Lopez Mateos took office. He is succeeded by Gutierrez Roldan, an industrialist and financier.

NORTHERN ZONE

Northeastern District

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Brasil, 1949*	6,685	3	....	....	54,905	..
Francisco Cano, 1949	5,420	6	....	434	1,929,692	48
Lomitas, 1954†	4,839	1	....	....	14,887	42
18 de Marzo, 1956†	7,120	1	....	1	4,052	36
Mision, 1955†	7,717	2	....	96	144,466	46
Monterrey, 1950†	5,781	2	....	170	618,420	47
Reynosa, 1948†	4,613	69	....	330	3,566,996	63
Rio Bravo, 1953	4,377	1	....	2	4,346	47
Trevino, 1950	5,797	8	41	1,325	4,713,966	37
Valadeces, 1948*	5,980	1	....	....	21,115	..
Others	....	....	....	....	2,572	..
Total Northeastern District		94	41	‡2,358	11,075,417	

*Condensate field. †Includes condensate production. ‡District produces another 5,123 bbl. daily in absorption liquids.

Northern District

Constituciones, 1956	6,247	11	1	3,991	847,378	19
Panuco-Cacalilao, 1901	1,150	540	89	16,688	871,287,301	12
Tamaulipas, 1956	4,190	12	4	4,509	2,239,667	..
Others	....	9	....	152	10,114	..
Total Northern District		572	94	25,340	874,384,460	

Southern District

Cabo Rojo, 1953	3,936	....	....	135	65,535	22
Moralillo, 1948	4,592	19	....	926	8,618,207	12
Naranjo-Cerro Azul (Golden Lane), 1908	2,200	230	2	10 983	1,136,816,729	20
Solis, 1952	2,132	29	....	1,694	4,573,222	22
Others	....	6	....	40	1,412,302	..
Total Southern District		284	2	13,778	1,151,485,995	

Poza Rica District

Allende, 1955	7,470	....	....	....	19,342	27
Avila Camacho, 1952	5,189	1	....	25	146,605	35
Chote, 1955	7,704	1	....	....	42,811	24
El Hallazgo, 1957	10,155	7	....	8,479	454,898	25
Gran Morelos, 1957	9,880	3	....	1,286	1,252,641	27
Guerrero, 1955	6,578	1	....	302	3,720,845	26
Gutierrez Zamora, 1956	6,414	2	....	98	332,129	17
Hidalgo, 1954	7,720	8	....	1,554	4,742,300	31
Independencia, 1957	9,293	....	....	....	5,585	31
Macarena, 1955	10,332	1	....	36	28,979	22
Nuevo Progreso, 1955	7,177	7	4	1,306	2,197,225	31
Poza Rica, 1930*	6,900	288	....	89,453	715,637,455	35
San Andres, 1956	10,286	58	....	41,281	15,715,622	29
Tajin, 1954	7,950	....	1	....	138,833	34
Tecolutla, 1956	7,756	1	....	113	234,993	31
Xiliapa, 1958	....	2	....	1,723	79,235	..
Others	....	....	....	....	3,030,713	..
Total Poza Rica District		380	5	†145,638	787,780,206	

*Includes Mecatepec, Escolin, Coatzintla, Talaxca, Aleman, and Progreso. †The district produces an additional 7,542 bbl. daily of absorption liquids.

NEW GOLDEN LANE

Acuatempa, 1955	4,019	19	....	3,036	7,069,078	21
Boca de Lima, 1956	5,702	....	....	....	198,266	16
Caristay, 1957	4,885	....	....	....	....	23
Chichimantla, 1955	3,885	2	....	538	225,859	21
Copal, 1957	4,595	....	....	....	25	15
E. Ordonez, 1952	4,723	16	....	4,648	33,928,153	21
Horcon, 1952	2,804	4	....	627	1,056,376	20
Las Canas, 1956	2,795	....	....	....	1,717	23
Mesa Cerrada, 1956	3,934	4	....	970	427,528	22
Mozutla, 1953	4,002	5	....	639	6,208,954	18
Nueva Colonia, 1956	2,936	1	....	100	60,955	17
Ocotepec, 1953	3,395	5	....	1,636	6,760,386	20
Sta. Agueda, 1953	4,491	47	....	15,550	43,137,602	16
Tihuatlan, 1957	3,063	2	....	123	56,340	22
Xacotla, 1953	3,294	3	....	199	60,534	15
Total New Golden Lane		108	....	28,066	99,191,773	

MEXICO PRODUCTION (Continued)

CENTRAL ZONE

Vera Cruz District

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Angostura, 1953	3,600	8	6	5,137	13,497,411	15
Casa Blanca, 1953	2,220	1	....	4	4,484	40
Tres Higueras, 1955	1,782	3	....	58	91,953	34
Total Vera Cruz District		12	6	5,199	13,593,848	

SOUTHERN ZONE

Isthmus of Tehuantepec

Acalapa, 1947	2,051	1	2	358	2,021,910	30
Agata, 1956	3,199	13	2	3,236	531,926	34
Arroyo Blanco, 1952	2,180	3	19	505	1,713,301	30
Concepcion, 1909	2,130	....	....	....	57,098	41
Cuichapa, 1934	2,100	2	11	901	5,707,471	30
El Burro, 1930	2,460	7	42	1,301	22,152,194	26
El Plan, 1931	1,970	36	104	11,471	104,046,748	30
Filisola, 1921	1,585	....	37	722	23,983,449	22
Ixhuatlan, 1911	1,017	1	68	660	1,283,259	21
Los Soldados, 1953	4,480	....	....	....	31,452	32
Moloacan, 1948	1,370	....	13	203	918,231	26
Nuevo Teapa, 1928	429	....	14	147	701,372	36
Rabon Grande, 1951	2,296	....	16	984	4,643,278	32
Tacuilolapa, 1955	2,920	2	4	388	399,981	36
Tonala, 1928	1,640	3	72	1,861	53,942,787	28
Others	....	....	....	.....	357,014	..
Total Tehuantepec		68	404	*22,737	222,491,471	

*District produces additional 250 bbl. daily of absorption liquids.

Tabasco District

Fortuna Nacional, 1949	5,330	3	....	44	271,634	53
Jose Colomo, 1951	5,230	36	9	691	3,478,848	46
La Venta, 1954	4,698	96	....	13,372	6,884,092	41
Magallanes, 1957	3,829	2	....	1,466	2,289	27
Morales, 1954	3,104	....	....	.....	799	51
Ogarrio, 1957	5,722	23	....	6,311	1,171,940	38
Vernet, 1928	3,465	6	1	421	577,289	48
Mecoacan, 1958	....	1	....	.....	5,214	35
Others	....	....	....	.....	835	..
Total Tabasco District		167	10	*22,305	12,392,670	
Total Mexico		1,685	562	†243,116	3,132,395,840	

*District produces additional 10,520 bbl. daily of absorption liquids.

†Plus an additional 45,768 bbl. daily in absorption liquids.

MEXICO REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Pemex:					
18 de Marzo—Atzcapotzalco	100,000	18,000	(1)	.....	55,000 V, 39,000 PD, 500 Is, 1,200 Alky
Ing. Antonio M. Amor—Salamanca	[2]40,000	5,000	.....	.....	15,000 V, 9,000 PD, 2,600 L, 800 A
Madero—Madero	[3]75,000	8,500	.....	.....	18,000 V, 11,500 PD, 3,200 A
Arbol Grande—Arbol Grande	26,000	.....	.....	.....	2,750 A
Mata Redonda—Villa Cuauhtemoc	14,000	9,500 Vis	.....	.....	.....
Reynosa—Reynosa	10,000	2,000	.....	.....	.....
Poza Rica—Poza Rica de Hidalgo	[4]97,000	.....	.....	.....	.....
Minatitlan—Minatitlan	[5]85,000	.....	12,000 TCC	.....	26,000 V, 1,400 Poly, 800 L
Total	447,000	43,000	12,000	.....	

(1) 25,000-bbl. Fluid cat cracker (Esso Model IV) due for completion January 1959, 3,400-bbl. H.F. alkylation unit due completion 1959 plus cat poly unit for production of tetramer. (2) Plan addition of 40,000-bbl. crude unit, 30,000-bbl. vacuum unit, 20,000-bbl. cat cracker and poly unit. (3) 100,000-bbl. crude unit, 55,000-bbl. vacuum unit, 30,000-bbl. Fluid cat cracker, and poly unit under construction. All due for completion 1960. (4) Includes 90,000-bbl. crude stabilizer. (5) Includes 28,000-bbl. daily crude stabilizer.

PERU

PERU'S oil industry had no outstanding gains this year, and there is little hope for an immediate change in fortune.

International Petroleum Co., which produces about 90% of Peruvian oil, as operator for its own properties and those of Cia. Petrolera Lobitos, has curtailed its investment program because of government failure to raise product prices to economic levels. This policy has pinched profits from International's 47,000-bbl. Talara refinery, which supplies local markets with most of its output. The cutback in operations has been reflected in the drilling schedule. Eight wildcats were drilled the first half of the year, and total footage for all wells was 268,700 ft. No wildcats have been planned for the last half, and anticipated footage in development wells is down to 193,000 ft. The production comes from fields discovered around the turn of the century, or earlier, and 3,055 active wells average 15½ bbl. daily.

But other drilling programs are in progress in the coastal region, where International's production is located. Cities Service and Richfield Oil have acquired a 26,000-acre offshore tract off El Alto field. The first well is under way. Twenty wells are being drilled on an interest basis for Amotape Oil Co. by a Dallas firm, Panatex Drilling Corp.

In eastern Peru, nothing exciting has occurred since the discovery at Maquia last year by the German company, Cia. El Oriente. The first three Maquia wells were brought in at about 2,100 ft. as 500-bbl.-daily producers. But wells since then have either been noncommercial or comparatively small.

The Texas Co. has abandoned its fourth wildcat in its drilling program in eastern Peru. The 1 Yurimaguas was bottomed at 7,591 ft. It was drilled on the Huallaga River on a concession in which the company had obtained two-thirds interest from El Oriente. The only production in the country east of the Andes Mountains is from small Agua Caliente field, where no drilling is being done at the present time.

PERU PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping	Daily	Cumulative	
Agua Caliente, 1937	900-1,400	5	9	1,976	3,506,538	44.2
Cope, 1938	650					
La Brea-Parinas, 1888	3,000	199	1,715	25,562	402,712,377	36.0
Lima Concessions, 1901	3,000	112	1,029	21,804	115,735,335	38.4
Maquia, 1957	2,137-2,162	†3				38
Mirador, 1955	5,000	7		400		38.0
Patria Concession, 1943	2,000					42
Sector Peru, 1953	3,500	*21	*150	*4,600		31
Tablazo, 1955	6,000					33
Zorritos, 1863	2,000					36.8
Total		347	2,903	54,342	523,070,722	

*Estimated. †Shut in.

PERU REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Cia. de Petroleo Ganzo Azul, Ltd., Agua Caliente	1,000				
Empresa Petrolera Fiscal, Iquitos	1,200				
International Pet. Co., Ltd., Talara	47,000	15,200			155 L, 360 A
Total	49,200	15,200			

PARAGUAY

WILDCATTERS have returned to landlocked Paraguay for the first time in 9 years.

Pure Oil Co. of Paraguay, Inc., is drilling the first of at least two wells on a 23,200-sq.-mile concession in the rugged Chaco region in the northern part of the country. The company, with 30% interest in the venture, is the operator. Its partners are Williams Brothers, Paraguay Gulf, Sinclair Paraguayan Oil, and Tidewater Oil Co.

Another drilling program in the Chaco area failed to get off the ground. International Products Corp., New York, which has a livestock and other business in the country, obtained a 7.5-million-acre concession in January. But its partner in the deal, a Rimrock Tidelands subsidiary, withdrew a few months later by mutual consent.

URUGUAY

WORK has started on an expansion program at the government refinery near Montevideo. ANCAP is adding 28,000 bbl. of new capacity. When it goes on stream early in 1960, present facilities will be cut back from 27,000 bbl. to 18,000 bbl., making total capacity 46,000 bbl. No exploration is in progress.

URUGUAY REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Administracion Nacional de Combustibles, Alcohol y Portland Refineria ANCAP-Montevideo, Teja	[1]28,000	2,000	.....	.....	750 V, 350 A
Total					

(1) Expansion program to double output under way. New units include 28,000-bbl. crude, 10,000-bbl. vacuum unit, 5,000-bbl. Orthoflow "B," 3,000-bbl. CR Sinclair Baker-Kellogg and 3,000-bbl. asphalt unit.

TRINIDAD

SLOW, STEADY PROGRESS is being made in Trinidad, and crude production late this year passed the 100,000-bbl.-daily mark for the first time.

The island's producing industry resembles some parts of the U. S., with output from many small, intensely developed fields. Trinidad wells average 16 bbl. daily.

Operators are doing their best to develop more offshore production on the Trinidad side of the Gulf of Paria. Trinidad Northern Areas (Texaco Trinidad, Inc., Trinidad Shell, and British Petroleum) produces 2,000 bbl. daily from three wells from a platform in Soldado field. Six wells have been drilled from another platform to the east, and the field's third platform is being installed to the west of the initial wells. A wildcat is being drilled 1 mile north of the discovery from a German-made mobile platform.

Texaco this year acquired the assets and properties of Antilles Petroleum Co. which had been owned by McColl-Frontenac Oil Co., an affiliate of The Texas Co. It has started a drilling program on a 36-well permanent platform on an extension of Antilles' Brighton field.

Dominion Oil Co. (California Standard) is drilling in the gulf from a floating platform, converted from a supply barge. The company has just abandoned 1 North Brighton, 30 miles southwest of Port-of-Spain, at 10,814 ft. This is believed the deepest hole ever drilled from a floating barge. In 6 years, Dominion has drilled 23 onshore wells plus 3 offshore tests without finding oil.

Texaco is the largest refiner on the island with a 115,000-bbl. plant at Pointe-a-Pierre. It plans to double the capacity in a $20,000,000 expansion program.

TRINIDAD PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Balata-Bovallius, 1952	7,200-9,426	.....	.....	523	.....	29-35
Brighton-Vessigny and Adjacent Marine Area 1908	700-7,500	.....	.....	4,803	.....	16-38
Cats Hill, 1953	1,400-9,095	.....	.....	5,626	.....	29-46
Forest Reserve-Apex-San Franique-Pt. Fortin East, 1913	1,000-16,115	.....	.....	32,840	.....	15-33
Guayaquayare, 1902	500-7,919	.....	.....	3,125	.....	15-49
Inniss/Trinity, 1956	5,127	.....	.....	4,688	.....	33
Kern-Parrylands-Cruse, 1913	2,000-10,626	.....	.....	5,757	.....	13-30
Moruga, 1953	9,693	.....	.....	1,425	.....	11-40
Oropouche, 1954	2,000-9,077	.....	.....	812	.....	35
Palo Seco-Los Bajos, 1926	460-12,718	.....	.....	11,950	.....	16-33
Penal-Barrackpore, 1918	1,300-11,067	.....	.....	10,699	.....	11-35
Point Fortin-Point Ligoure and adjacent Marine Area, 1908	1,000-10,800	.....	.....	9,714	.....	15-45
Quarry-Coora-Quinam-Morne Diablo, 1936	280-14,018	.....	.....	7,318	.....	16-30
Colenso, 1958	.....	.....	.....	10	.....	.....
Total Trinidad		925	*2,203	†99,290	‡618,000,000	

*Includes gas/air lift, plunger, etc. †Daily average first 6 months. ‡Estimated.

TRINIDAD REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Brighton Terminal, Ltd., Brighton	5,000	.....	.....	.....	.....
Shell Trinidad, Ltd., Point Fortin	[2]38,500	.....	.....	.....	.....
Texaco Trinidad, Inc., Pointe-a-Pierre	[1]115,000	38,000 Vis	26,500 FCC	8,000 Pf	8,000 Un, 2,500 Alky, 1,400 A, 60,000 V
Total	158,500	38,000	26,500	8,000	

(1) 15,000-bbl. crude unit under construction. Company plans doubling crude capacity. (2) Calendar day.

VENEZUELA

VENEZUELA this year has been marked by political upheaval, a decline in crude production, and exceptionally good drilling success on some new concessions in Lake Maracaibo.

The oil industry was unscathed in the brief revolution which overthrew Dictator Perez Jimenez, and operations ran smoothly under the military junta, headed by Admiral Wolfgang Larrazabal. Presidential candidates in their preelection campaigns demanded a greater share of oil profits for Venezuela. But companies are keeping their fingers crossed that the road ahead will not be too rough, on the grounds that the existing 50-50 profit split is fair and workable, and that in practice the government already gets 56% to 57% of the profits.

Crude production continued the decline that began after the Suez Canal reopened last year, and which was further depressed by the general business recession. Output has started rising, however, after falling nearly a half-million barrels daily below last year's peak of 2,968,000 bbl. daily.

Extensive drilling still is under way on concessions which cost companies $667,000,000 in bonuses and initial taxes 2 years ago. Spectacular results are continuing on some Lake Maracaibo blocks, and a leading industry question is how fast production developed by newcomers will grow, and where will it find markets.

New companies in the lake are now producing more than 100,000 bbl. daily, and this is only a starter. Superior Oil is the leader, with output on individual days going as high as 67,000 bbl. Its output is from Lama field on a 7,774-acre tract in mid-lake for which it paid $22,000,000.

Production also is moving from 24,000-acre Block 1, where Venezuelan Sun, the operator, has completed 15 producers, 5 of them dually. The best well makes better than 10,000 bbl. daily. Sun's partners in the block are Venezuelan Atlantic, and Texaco Seaboard. Reports are that the group will build a 100,000-bbl.-daily automatic flow station and lay an 18-in. flow line from the block to a new terminal at Punta de Palmas. The terminal was built jointly with some of the other new companies in the lake.

Other new production is from Signal Oil & Gas Co.'s Centro Lago field on Block 4, and San Jacinto's Marlago field on a small national reserve tract. Signal has completed five wildcats and one development well as producers. Two more are drilling. Partners are Hancock Oil Co., Pure Oil Co., and Standard Oil Co. (Ohio). San Jacinto's partners are Union Oil Co., Murphy Corp., Monsanto Chemical Co., Tennessee Gas Transmission Co., Sharples Oil Corp., and American Petrofina.

Phillips Petroleum Co. has established Santa Maria field with one 4,000-bbl.-daily test on Block 10. Its partners are San Jacinto, El Paso Natural Gas Co., Sunray Mid-Continent Oil Co., Pacific Petroleums, Ltd., and Western Natural Gas Co. Phillips also has brought in the most southerly and westerly discovery ever made in the lake, on Block 17, where it is working with Sunray Mid-Continent, Ashland Oil & Refining Co., Kerr-McGee Oil Industries, Inc., Pacific Petroleum, Canadian Atlantic, Western Natural Gas, and El Paso Natural.

Venezuela's big three companies, Creole Petroleum Corp., Cia. de Shell, and Mene Grande Oil also have had success in the lake. But with established production in hand, they have been in less hurry to move ahead with development work. The exception is Shell, which is laying a 12½-mile, 20-in. flow line from a 10,185-acre national-reserve tract, where it has wells offsetting San Jacinto's Marlago production.

In the Gulf of Paria, the first well drilled by Paria Operations brought in a 2,000-bbl.-daily producer. The second test has been abandoned, and the rig moved northwest for a third test. The Texas Co., Continental Oil Co., Ohio Oil Co., Cities Service Oil Co., and Richfield Oil Corp. paid more than $100,000,000 for tracts covering 153,000 acres in the gulf.

Eastern Venezuela

In eastern Venezuela, the Phillips group which owns Block 17 has found a major low-gravity-oil reserve in the Temblador area on a new concession. Pan Venezuelan (Indiana Standard) is developing heavy oil in Mona field, found in a new block offsetting Creole's Jobo field.

Shell is combining its Maracaibo operations into one big, virtually automatic crude gathering and terminal system. The $100,000,000 program will completely revamp the handling of 700,000 to 900,000 bbl. daily the company produces in the area.

About half of Shell's production will be moving through the system early next year. By 1960, Puerto Marinda terminal just inside the lake entrance will handle up to 12 grades of crude, including Boscan from the west side of the lake. Up to 880,000 bbl. daily will move to the terminal through more than 100 miles of new trunk pipelines, some of them heated.

The project has been made possible by the new channel at the lake entrance, which permits big tankers to come in for the first time. Creole has also taken advantage of the new channel by building a new $27,000,000 terminal at La Salina.

One new refinery building program was started this year. Socony Mobil Oil Co. is building a 40,000-bbl. plant at El Palito, the Caribbean terminal of a 211-mile, 20-in. pipeline from Barinas. The plant will process crude mainly from San Silvestre field.

Shell is expanding its Pagline system carrying gas from La Paz field, west of Maracaibo, to Cardon refinery on Paraguana Peninsula. Throughput of the 178-mile, 20-in. line is being boosted to 100 million cubic feet daily, and a spur line is being added to carry gas to Creole's Amuay plant.

The government's petrochemical program at Moron turned out to be one of the biggest scandals of the old regime. The new government charges that $150,000,000 was spent at Moron with little to show for it except a 2,900-bbl. pilot refinery, and several unfinished petrochemical units. But a decision has been made to complete the Petroquimica program.

The post of minister of mines, the top oil job in the Venezuelan Government, was held for part of the year by Dr. Carlos Perez de la Cova. After his vigorous defense of the free enterprise oil industry in the election campaign, he was displaced by Julio Diez. Dr. Perez de la Cova is returning to his former post in Washington, as Minister Counsellor for Petroleum Affairs.

WESTERN VENEZUELA PRODUCTION

State of Barinas

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily 1st 6 mos.	Production in bbl.—Cumulative	Gravity °API
Estero, 1957	10,700	1		48	8,818	27.9
Maporal, 1957	10,994	1	1	8	1,384	28.1
Palmita, 1957	10,792	1		413	74,698	28.1
Sinco, 1953	8,500-9,100	32		39,322	7,586,552	26.1
San Sylvestre, 1945	8,858	23		15,337	3,196,272	28.1
Silvan, 1949	10,862	4		6,476	1,172,312	28.1
Total Barinas		62	1	61,604	12,040,036	

State of Trujillo

Motatan, 1938	8,850	*5		66	2,737,609	22.4
Total Trujillo		5		66	2,737,609	

State of Falcon

Cumarebo, 1913	1,968	6	7	2,333	52,854,444	48.0
Hombre Pintado, 1927	1,000		46	685	6,148,162	23.2
Mamon, 1926	3,350	*5		123	575,651	32.4
Mene Mauroa, 1921	600-1,850		57	900	28,740,403	36.6
Tiguaje, 1953	3,328-3,348	14	4	2,172	1,310,862	27.5
Total Falcon		25	114	6,213	89,629,522	

*Shut in.

State of Zulia

Alturitas, 1950	10,950		1	72	13,095	18.9
Bachaquero, 1930	3,444-11,500	222	*716	†306,634	862,808,900	14.1-32.1
Barua, 1958	10,500	1		134	24,253	18.0
Boscan, 1946	6,500-7,500	1	294	84,016	125,297,238	10.2
Cabimas, 1917	2,200	108	652	54,247	845,761,492	18.0-26.4
Ceuta, 1956	9,600-11,000	5		4,476	1,049,324	40.4
Concesiones Lacustres, 1947	7,000	153		234,953	218,646,662	30.8
Curazaito, 1957					8,554	19.8
El Cubo, 1916	984	38	110	22,584	168,608,413	34.3
Ensenada, 1948	8,550	1		67	526,719	52.0
La Concepcion, 1935	3,148-8,000	25	53	12,627	64,852,442	36.1
Lagunillas, 1926	3,000	356	‡1,214	560,554	3,140,432,901	16-27.3
Lama (Lagunillas), 1957	8,600	8		11,898	2,153,502	32.8
La Paz, 1925	4,264-8,000	18		94,320	532,527,344	33.5
Macoa, 1946	6,000-10,200		*1	6	1,000	11.0
Mara, 1945	5,248	22	(§)	40,407	269,580,348	29.6-30.2
Mene Grande, 1914-1957	4,132	2	¶474	38,758	473,864,714	18-26.9
Pueblo Viejo, 1940‖	1,968				21,964,786	13.7
San Jose, 1948	10,000-15,500	1		341	61,785	30.2
Sibucara, 1948	13,451	5		5,474	26,601,724	37.0
Tia Juana, 1928	3,000	175	**740	200,293	1,218,370,368	14.2-27.8
Urdaneta, 1957	7,600-8,000	2	2	1,468	754,438	10.9-30.0
Total Zulia		1,143	4,313	1,673,329	7,973,910,002	
Total Western Venezuela		1,235	4,428	1,741,212	8,078,317,169	

*Another 1,153 pumping wells shut in. †Includes new Lake Maracaibo production of Sun and Signal. ‡Another 940 wells shut in. §59 wells shut in. ¶171 wells shut in, including 5 new lake wells of San Jacinto group. ‖Included in Bachaquero. **Another 757 wells shut in.

EASTERN VENEZUELA PRODUCTION

State of Anzoategui

Apamate, 1951	6,670	1		35	43,605	44.9
Araibel, 1954	10,516	8		3,655	8,029,061	35.9
Boca, 1951	9,500	19		9,785	28,462,268	33.2-34.8
Bruzual, 1954*	2,900				70,000	41.1
Cachama, 1952	7,724	2		220	497,166	31.5
Caico Seco, 1946	6,500-7,300	9		4,228	14,912,130	37.0-40.1
Capacho, 1945*	4,115			27	4,887	23.3
Cascaroncito, 1953*	8,968				21,068	44.0
Cerro Pelado, 1951*	4,400				108,102	38.2
Chaparrito, 1957					13,209	32.9
Chimire, 1948	7,000-7,200	102		48,177	144,431,185	35.8-37.2
Chive, 1957*					1,934,629	31.2
Dacion, 1951	6,700	47	9	29,579	69,257,378	21.5-22
Elias, 1957	5,100-5,300	6	1	1,302	459,171	33.5
El Roble, 1939	8,044-11,650	16		3,155	29,844,506	45.9-47.5
Esquina, 1951	4,360	6		1,976	1,473,058	32.4
El Toco, 1948	9,000	12		4,223	12,738,893	42.8
Flecha, 1953	5,736	1		935	1,066,335	39.1
Fria, 1948	6,500-7,300	10	2	3,333	7,729,871	36.9
Galan, 1957*					1,076	34.2
Guara, 1942	5,000-10,000	86	39	43,712	292,176,651	28.2-33.6
Guara, East, 1942	5,700	3	14	2,609	2,689,738	18.6
Guario, 1940	5,000-10,000	22		5,202	30,909,247	44.8

EASTERN VENEZUELA PRODUCTION (Continued)

Company—Refinery location—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Guere, 1951	7,800	7		2,026	18,160,489	37.3
Guico, 1944	4,500-7,000	14	1	4,165	49,725,990	37.4
Inca, 1948	7,100				622,571	39.1
Isla, 1954	5,470	2		266	547,483	44.1
Juanita, 1956	4,000	3		624	112,889	35.3
Junta, 1954	6,720	19	2	4,549	4,668,685	23.8
Kilo, 1955	9,600	1		405	73,345	31.8
La Ceibita, 1953	9,871-9,878	5		4,507	4,615,470	33.8
La Vieja, 1951*	2,750			565	2,214,533	25.2
Las Adjuntas, 1954	7,000-7,200	6		2,211	1,323,656	27.3-28.2
La Freitera, 1957	14,554	1		106	68,992	37.4
Leona, 1938	8,000	39	7	17,515	44,879,132	27.5
Lobo, 1952*	6,400			269	1,773,653	24.5
Los Mangos, 1950*	7,743			42	274,781	42.3
Luna, 1957	5,720		5	192	108,776	13.0
Mapiri Este, 1949	9,500	11		4,769	12,831,222	34.9
Mata, 1951	11,250	99		44,150	45,827,204	30.5-34.2
Merey, 1937	5,700	3	51	6,376	9,177,764	14.2-16.9
Nipa, 1945	6,000-8,500	208	5	84,949	162,746,484	31.3-40.5
Oficina, 1937	5,900	108	162	72,913	345,633,118	23.8-27.1
Oscurote, 1953	9,513	46		23,261	26,197,621	26.3
Pelayo, 1947	6,650	3		256	695,008	23.0
Pradera, 1951	6,430	8		1,419	2,097,224	28.7
Quiamare, 1942	5,900-6,650	14		2,327	8,186,263	41.8
Rincon Largo, 1941	6,500-8,500	2		140	6,750,796	51.3
Rosa, 1958	11,412	1		139	25,090	38.0
San Joaquin, 1939	6,560	34		6,047	22,244,186	46.3
San Roque, 1949	8,500	17		1,475	13,035,759	53.0
Santa Ana, 1936	8,500	40		18,164	38,524,930	36.2
Santa Rosa, 1941	8,500	84		46,352	65,342,016	43.4
Soto, 1949	9,500	85		30,606	78,280,568	34.9-35.7
Tacata, 1946	2,200	1		149	440,907	38.6
Tapuco, 1952	10,000-10,170	13		5,230	12,041,694	32.2
Unare, 1954*	2,900			55	18,442	41.4
Yopales, 1937	4,600	22	33	10,005	17,622,100	22.8
Zeta, 1954	10,700	85	3	42,307	48,369,396	31.7
Total Anzoategui		1,331	1,078	600,684	1,692,131,471	
*Shut in.						
Federal Territory of Amacuro						
Pedernales, 1933	1,571	7		5,404	43,985,669	20.7
Posa 112-1, 1958*				26	4,730	18.7
Tucupita, 1945	5,606	40		5,886	30,427,908	16.7
Total Amacuro		47		11,316	74,418,307	
*Shut in.						
State of Guarico						
Aragua, 1950	7,519-8,822	12		1,114	2,661,754	53.6
Belen, 1954*	4,648			9	8,662	50.0
Bella Vista, 1952	2,962-4,637	12		2,717	5,416,457	24.1
Dakoa, 1951*	3,500-5,700				327,485	34.7
Grico, 1946*	400-4,870				130,000	28.8
Ipire, 1958*	3,000-5,000			103	18,624	36.6
Las Mercedes, 1942	4,160-4,500	99	22	20,308	78,290,555	32.2
Punzon, 1946*	4,400			93	496,227	36.6
Rositas, 1958*	4,320			39	7,126	25.3
Ruiz, 1949	4,450	9	1	4,705	21,742,812	31.5
Saban, 1947	2,600	11	25	2,940	12,157,754	37.8
Taman, 1949	5,200	1	13	1,399	11,377,049	38.8
Tucupido, 1947	2,800-5,600	7	10	1,438	14,820,439	38.8
Valle, 1955*	2,200-5,500			3	163,683	37.3
Total Guarico		151	71	34,868	147,618,627	
*Shut in.						
State of Monagas						
Aguasay, 1955	12,400-13,400	16		13,317	5,311,980	34.1-39.8
Cachipa*					16,926	33.9
Jobo, 1953‡	3,600			155	59,802	6.3-14.4
Jusepin, 1938	3,000-5,300	68		9,447	166,195,765	32.5
Manresa, 1954*	2,524-2,615			2	498,602	20.7
Mata Grande, 1946	4,700	7		1,556	6,607,112	26.5
Mulata, 1941	3,500-6,600	24		5,454	85,024,246	37.1
Muri, 1942	4,500	2	2	422	15,863,918	27.3
Oritupano, 1954	7,675	23	10	14,095	4,940,601	12.0-22.0
Orocual, 1933	2,954		1	248	2,087,722	11.8-14.1
Pilon, 1937*	3,355-3,600			1,789	841,605	12.8-14.0
Quiriquire, 1928	7,000-7,200	1	487	45,288	509,394,086	16.1
Santa Barbara, 1941	5,000-6,500	96	2	18,718	110,402,565	32.5-34.7

(Continued on next page)

EASTERN VENEZUELA PRODUCTION (Continued)

Company—Refinery location—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
El Salto, 1958*	5,720	.....	.....	23	4,145	11.2
Isleno, 1953*	3,281-3,304	.....	.....	4	667	13.0
Mo-su, 1958*	.....	.....	.....	2	346	12.5
Pirital, 1958*	450-1,100	.....	.....	209	37,770	18.9
Tacat, 1953	1,830-3,668	.....	55	7,140	4,617,694	18.2
Temblador, 1936	3,500-4,500	52	2	8,720	57,306,696	20.5-22.4
Travieso, 1944	4,000	.....	9	130	1,435,828	26.1
Uracoa*	.....	.....	.....	.....	3,604	15.3
Total Monagas		289	568	126,719	970,651,680	
Total Eastern Venezuela		1,818	1,717	773,587	2,884,820,085	
Total Venezuela		†3,053	6,145	2,514,799	10,963,137,254	

*Shut in. †Venezuela has 6,225 wells shut in. ‡Includes new five-well field of Pan Venezuelan; Creole has 19 shut-in wells.

VENEZUELA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Cia. Shell de Venezuela, Ltd.:					
Cardon	220,000	25,000	35,000 FCC	8,000 T	1,500 Alky, 2,000 Poly, 89,000 V
San Lorenzo	45,000	.....	.....	.....	.....
Colon Development Co., Ltd:					
Calvario	300	.....	.....	.....	.....
Casigua	1,000	.....	.....	.....	.....
La Rivera	300	.....	.....	.....	.....
Creole Petroleum Corp.:					
Amuay	345,500	.....	.....	.....	89,900 V, 778 L, 17,000 Hyd
Caripito	68,000	36,000 Vis	.....	11,100 Fhy	.....
Petroquimica—Moron	3,000	.....	.....	350 Cat	.....
Phillips Petroleum Co.—San Roque	3,500	.....	.....	.....	.....
Richmond Exploration Co.—Bajo Grande	[1]30,000	.....	.....	.....	7,000 A[2]
Sinclair Oil & Refining Co.—Puerto La Cruz	35,000	12,000 Vis	.....	.....	.....
Socony Mobil Oil Co. de Venezuela—El Palito	(4)	.....	.....	.....	.....
Texas Petroleum Co.—Tucupita	10,000	.....	.....	.....	.....
Venezuela Gulf Refining Co.—Puerto La Cruz	[3]59,000	14,500 Vis 12,000 Plf	8,650 FCC	.....	.....
Total	820,100	99,500	43,650	19,450	

(1) Adding 5,000-bbl. crude unit. (2) Adding 3,500-bbl. asphalt unit. (3) Adding 65,000-bbl. crude unit. (4) Building 40,000-bbl.-daily refinery to include 6,000-bbl.-daily cat reformer due for completion late 1959.

OTHER CARIBBEAN AND CENTRAL AMERICA

Bahamas . . . One of the most expensive wells budgeted in the history of the industry is drilling ahead at 12,736 ft. at Cay Sal Bank in the Bahamas. Subsidiaries of Standard Oil Co. of California and Gulf Oil Corp. decided to put up $3,000,000 for a 15,000-ft. wildcat after spending more than $400,000 for seismic work in a 1,700-sq.-mile concession. The well is being drilled in 30 ft. of water.

Two smaller companies also have taken concessions in the area. Consolidated Cuban Petroleum Corp. acquired 1,500 sq. miles in and around Andros Island. A Canadian firm, Siebens Leaseholds, Ltd., obtained 300,000 acres of onshore and offshore rights, including part of San Salvador.

British Honduras . . . Exploration in British Honduras now is in the hands of three firms, Phillips Petroleum Co., Royal Dutch-Shell, and Gulf Oil Corp. Phillips, the latest to enter the Central American crown colony, is starting a well in the Punta Gorda area. The company acquired rights on 2 million acres from Bandini Petroleum Corp., Belize Petroleum Co., and West Caribbean Oil Co.

Gulf, which once held a concession over the entire colony, still holds rights over most of the northern half and part of the southern half. It is now exploring the area jointly with Shell. They have drilled four dry holes.

Guatemala . . . Central America's first refinery will be built on Guatemala's Caribbean Coast near Puerto Barrios by a Louisiana firm, Beaux Bridge Oil Refining Co. Shell is helping to finance the 3,500-bbl. plant, and it will later supply the crude.

A wildcat will be drilled in the Peten area early next year by Ohio Oil Co., with a rig flown to the well site in one of the biggest airlifts ever planned. Coastal Plains Oil Corp., Houston, had a gas show in the country's first well, the 1 Carlos Castillo Armas, in Izabel. But the well has been temporarily suspended

at 4,500 ft., and the rig flown to Peten for three 2,000-ft. holes scheduled by Atlantic Refining Co.

Jamaica . . . Plans for a 16,500-bbl. refinery that would make Jamaica self-sufficient for most products has caused an interisland spat with Trinidad. Jamaica Oil & Chemical, Ltd., expects to open the plant in 1960, and expand it to 25,000 bbl. later. Trinidad, whose own refiners market in Jamaica, is taking issue with the neighboring government for approving the project.

Pan American Petroleum Corp. pulled out of the island, rig and all, after drilling three dry holes.

Panama . . . An offshore drilling program is being carried on in Laguna de Chireque on the Caribbean Coast of Panama by three independents, Champlin Oil & Refining Co., the operator, Kerr-McGee Oil Industries, and Southland Royalty Co. A Delhi-Taylor Oil Corp. subsidiary has a seismic program under way.

Two refinery projects have been planned for Panama. One firm, Panama Refining & Petrochemical, headed by East Coast investors, last year awarded a construction contract to Foster-Wheeler Corp. Panama Refining, Inc., headed by D. K. Ludwig, a tanker operator, has a plan of 2 years' standing for a 70,000-bbl. plant near the Atlantic entrance to the Panama Canal.

Puerto Rico . . . Commonwealth Oil Refining Co. is again enlarging its Guayanilla Bay refinery. Another 11,000 bbl. will raise capacity to 75,000 bbl. per stream day. The island's second plant at San Juan is rated at 13,500 bbl. It is operated by Caribbean Refining Co. Both plants operate on Venezuelan crude.

Other . . . Union Oil Co. suspended drilling in Costa Rica after taking its final test, 1 Liverpool, to nearly 11,000 ft. Union 2 years ago brought in a 1,800-bbl.-daily discovery near the Panama border. But the well ran to water, and tests failed to find commercial oil.

In Dominican Republic, H. S. Cole & Son, Houston, drilled a 10,800-ft. hole near Villa Isabel, and immediately made plans for a second test. The firm has an exploration agreement with Petrolera Dominicana C.A. on a 2,100,000-acre concession. In Barbados, Kerr-McGee is earning 25% interest in a 166-sq. mile concession held by Gulf Oil by drilling 1 Morgan Lewis, Gulf's sixth test.

NETHERLANDS WEST INDIES REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Lago Oil & Transport Co., Ltd., Aruba	440,000	340,000 Vis	43,000 FCC	.....	20,500 V, 5,300 Alky
N.V. Curacaosche Pet. Industrie Mij., Curacao	210,000	85,000	35,000 FCC	20,000 T	.....
Total	650,000	425,000	78,000	20,000	

PANAMA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Panama Ref. & Petrochemical Co., Inc.—Portobello Harbor	(1)	.....	.....	.....	.....
D. K. Ludwig—Las Minas Bay	(2)	.....	.....	.....	.....

(1) Planned 55,000-bbl. refinery. (2) Planned 70,000-bbl. refinery.

PUERTO RICO REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Caribbean Refining Co., Bayamon	13,500	.....	13,100 FCC	.....	9,000-V, 500-Poly
Commonwealth Oil Refg. Co., Inc., Guayanilla	164,000	.....	53,600 HD	7,460 HF	40,300-V, 1,400-Alky, 2,370-Poly
Total	77,500	.....	66,700	7,460	

(1) Adding 11,000-bbl. crude capacity, 8,400-bbl. vacuum unit, 20,000-bbl. visbreaker, 7,500-bbl. Unifiner.

EUROPE

AUSTRIA

THE AUSTRIAN oil industry is troubled by declining crude production, and new fields big enough to prop up output have not yet been found.

Output has slipped below 52,000 bbl. daily, a drop of more than one-fourth since the country regained the major fields from Russia 3 years ago. The oil-reparations agreement with Russia has been revised to ease the load on Austria, but the burden still is heavy in the face of slipping output.

Under the revised agreement, Austria is to continue shipping 20,000 bbl. daily free of charge to Eastern Europe for 7 more years. But Russia, in return, will now ship into Austria 10,000 bbl. daily of sulfurous Soviet crude. Another 4,000 bbl. daily originally was to be shipped to the Iron Curtain for 6 years in payment for factories. Machinery and other products will now be substituted for oil.

Only a small fraction of crude output is handled

EUROPE

LEGEND

- OIL FIELDS
- GAS FIELDS
- REFINERIES
- OIL PIPELINES
- GAS PIPELINES
- EXPLORATION ACTIVITY

PRODUCTION AND REFINING CAPACITY

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
Austria	56,638	49,310
Belgium		175,900
Denmark		630
Finland		23,000
France	28,263	713,200
Germany (West)	86,751	406,570
Greece		30,000
Italy (incl. Sicily)	28,372	722,900

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
Netherlands	29,672	349,000
Norway		2,000
Portugal		22,900
Spain		144,700
Sweden		47,850
United Kingdom	1,622	917,900
Yugoslavia	8,633	27,500

by private companies. R. Keith van Sickle produces about 500 bbl. daily from concessions in Eastern Austria. R.A.G., a joint Socony-Mobil, Royal Dutch-Shell company, has an 80-bbl., 1-well field at Puchkirchen in western Austria. R.A.G. also produces about 2,000 bbl. daily from properties in eastern Austria.

Austria's chief production comes from fields found on concessions held by R.A.G. before World War II.

The state oil agency, O.M.V., is carrying on a joint exploration program with British Petroleum Co. on concessions covering 770 sq. miles in lower Austria.

O.M.V. is building a 49,000-bbl. refinery at Schwechat. The first stage is expected to open next year.

AUSTRIA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping*	Daily	Cumulative	
Aderklaa, 1939	5,000	2	38	1,200	10,837,394	45
Goesting, 1934	4,800	....	40	700	11,913,760	29
Grubenfelder Neusiedl/Zaya, 1937	2,900	3	37	529	1,286,620	25.7
Matzen-Auersthal, 1949	4,500	102	245	46,000	125,174,893	19-41
Muehlberg, 1941	5,500	1	97	3,800	27,614,280	31
Neusiedl/Zaya, 1939	4,000	....	158	2,100	30,036,294	31
Puchkirchen, 1956	7,750	....	1	90	75,212	36.4
Zistersdorf-Gaiselberg, 1934	....	....	77	2,219	24,150,875	25
Total	....	108	693	56,638	231,089,328	

*Includes gas lift.

AUSTRIA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
A.G. der Shell-Floridsdorfer Mineraloelfabrik—Floridsdorf	4,500	....	....	....	....
Vacuum Oil A.G.—Kagran	3,400	....	....	....	230 V, 140 L, 70 A
Oesterreichische Mineraloelverwaltung A.G.:					
Kledering	150	....	....	....	....
Korneuburg	7,000	....	....	....	....
Lobau	8,800	....	....	....	....
Moosbierbaum	9,500	6,000	....	....	....
Schwechat	[1]13,300	5,000	....	....	....
Voosendorf	2,300	....	....	....	....
Richard K. Van Sickle—Neusiedl/Zayo	360	....	....	....	....
Total	49,310	11,000	....	....	

(1) First stages of new 49,000-bbl. refinery slated for completion by end of 1959.

BELGIUM

BELGIUM refiners are standing pat with their present facilities for the most part. There are no major changes planned for the near future outside of a 6,000-bbl. addition to the Antwerp plant of Raffinerie Belge de Petroles. Special units also are being added at the refinery. No exploration is under way in the country.

The young international company, Petrofina, headquartered in Belgium, continues to expand. It is building a refinery in West Germany. It has opened a small plant and new crude production in Angola, West Africa, and has growing production in Egypt through 40% interest in International Egyptian Oil Co.

BELGIUM REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Albatros S. A. Belge pour le Raffinage de Petrole, Antwerp-Kiel	14,000	....	4,500 HD	....	6,000 V, 700 Poly
Belgium Shell Co., S. A., Ghent	3,000	....	....	....	530 L
Cie. Industrielle "Atlas," S. A., Antwerp	2,500	....	....	....	....
Esso Belgium, Antwerp	40,000	....	10,600 FCC	5,600 Pwr	2,900 V, 6,900 Hyd,
Esso Belgium, Hoboken	2,500	....	....	4,160 T	1,200 A
Raffinerie Belge de Petroles, S. A., Antwerp[1]	18,500	....	....	2,500 SB 3,000 T	3,500 V, 5,000 CH, 4,000 A
Ste. Industrielle Belge des Petroles, Kruisschans-Anvers	90,000	....	10,000 FCC	10,000 Pf 6,000 T	20,000 V, 10,000 BPH, 1,200 Poly
Tankage & Transport, S. A., Antwerp-Kiel	5,400	....	....	750 Pf	....
Total	175,900	....	25,100	32,010	

(1) Building 6,000-bbl. crude unit, 3,000-bbl. vacuum unit, 8,000-bbl. desulfurizer, 7,000-bbl. asphalt unit.

FRANCE

FRANCE is getting ready for the day when large volumes of Algerian crude will move northward across the Mediterranean.

In addition to other construction, at least three refineries have been planned to handle crude that will move northward from Marseille by pipeline. Omnium Francaise de Petroles will open a 60,000-bbl. plant near Chalon in 1961. Royal Dutch-Shell will open a 60,000-bbl. plant at Strasbourg in 1962. Pechelbronn, CFP, CFR, and Antar will build a 70,000-bbl. plant at Strasbourg.

British Petroleum has already prepared for Algerian crude by building a 44,000-bbl. unit at its Ste. Francaise des Petroles refinery at Lavera, near Marseille. The plant now can handle 104,000 bbl. daily.

Nineteen companies are participating in a study of a 30-in. crude system from Marseille to Strasbourg and the Upper Rhine Valley of West Germany. The group, under the name Ste. du Pipeline Sud-European, has replaced SAPPEUR, an earlier organization that had been studying a shorter system. The Sud-European project could become a part of the proposed trans-European line from Marseille to Rotterdam.

Commercial crude production was established in

FRANCE PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Bollwiller, 1958	6,000	1	.....	4	1,300	.....
Chateaurenard, 1958	1,700	1	.....	30	.....	.....
Clermont, 1957	7,500	1	.....	7	3,200	.....
Coulommes, 1958	6,000	2	.....	350	13,000	33
Donau-Soufflenheim, 1954	1,650	.....	11	120	158,100	30
Eschau, 1956	2,900	1	5	100	74,300	34
Gallician, 1951	6,600	2	.....	6	14,500	25
Lacq, 1949	2,200	17	13	1,900	12,222,000	22
Lucats, 1956	6,700	1	.....	130	13,900	38
Lugos, 1956	5,300	.....	6	750	262,700	21
Mothes, 1955	8,100	2	.....	900	400,000	21
Parentis, 1954	7,700	*20	8	22,700	21,911,400	33
Pechelbronn, 1813	600-4,000	4	327	537	22,894,451	27
Reiningue, 1955	4,700	1	2	60	83,800	40
Scheibenhard, 1956	3,000	15	1	630	216,700	32
Schirrheim, 1954	1,800	.....	2	13	34,700	29
Staffelfelden, 1952	6,300	.....	2	26	393,800	40
Total		68	377	28,263	58,697,851	

*Includes three injection wells.

FRANCE REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Antar Petroles de l'Antique, Donges	45,000	.....	10,000 TCC	13,000 HF	400-L
Caltex, S.A.F., Gironde	25,600	.....	5,700 FCC	4,200 T	10,600 V, 600 Poly
Cie. Francaise de Raffinage:					
Gonfreville	[2]80,000	9,000 Vis	[3]30,000 FCC	13,000 T	5,900 Poly, 2,500 L
La Mede	130,000	2,000	[4]15,000 FCC	17,000 T 20,000 Pwr	830 Un, 3,500 Poly
Cie. Raffinage Shell-Berne:					
Berre l'Etang[8]	75,000	4,700 Vis	11,000 FCC	11,000 T	.....
Pauillac[8]	16,500	.....	.....	.....	.....
Petit Couronne[8]	[5]50,000	.....	12,500 FCC	8,500 T	.....
C.F.P.-C.F.R.-Pechelbronn-Antar, Strasburg	(1)	.....	.....	.....	.....
Esso Standard, S.A.:					
Port Jerome[5]	85,000	.....	38,550 FCC	14,000 T	380 Poly, 4,200 L
Bordeaux	(6)	.....	.....	.....	.....
Mobil Oil Francaise:					
Gravenchon	18,500	.....	.....	3,900 CR 2,300 T	5,000 CH, 2,300 L, 6,000 V
Frontignan	27,000	.....	12,700 TCC	2,200 T	.....
Omnium Francaise de Petroles, Chalon	(9)	.....	.....	.....	.....
Pechelbronn, S.A., Merkwiller	4,600	.....	.....	.....	.....
Royal Dutch-Shell, Strasbourg	(10)	.....	.....	.....	.....
Ste. Francaise des Petroles B.P.:					
Dunkirk	52,000	.....	.....	7,000 T	13,000 V, 1,700 L, 2,000 A
Lavera	104,000	.....	.....	6,000 Pf 5,000 T	.....
Total	713,200	15,000	134,450	127,100	

(1) 70,000-bbl. refinery planned for 1960-61 completion. To process Sahara crude. (2) Adding 62,500-bbl. crude unit for April 1960 completion. (3) 19,000-bbl. fresh feed. (4) 11,600-bbl. fresh feed. (5) New 80,000-bbl. crude unit building to replace old crude capacity. Due completion late 1958. 11,000-bbl. hydrodesulfurizer under construction. 13,000-bbl. cat reformer planned. (6) Adding 14,500-bbl. Powerformer and 13,600-bbl. Hydrofiner. (7) 35,000-bbl. refinery under construction, 8,000-bbl. Powerformer. Completion 1960-61. (8) All figures on calendar-day basis. (9) Plan 60,000-bbl. refinery for completion in 1961. (10) Plan 60,000-bbl. refinery for completion in 1962.

the Paris basin this year following a discovery in 1 Coulommes, 27 miles east of Paris. Production has held up under development drilling, and several wells now total better than 600 bbl. daily.

Esso's Parentis field continues to be the mainstay of French production. Its output has leveled off at about 23,000 bbl. daily. Progress is being made on a $250,000,000 development program to utilize gas from Lacq field, which, like Parentis, is located in the Aquitaine basin of Southwest France. A 1,000-mile pipeline system will include 550 miles of 24 and 20-in. trunk to Paris. SNPA, the operator at Lacq, estimates proved reserves at 7 trillion cubic feet, and potential reserves at 14 trillion cubic feet.

Rimrock Tidelands, Inc., Shreveport, has entered French exploration through the purchase of Mofag Oil Exploration, which holds concessions in France and Switzerland. Another independent, D. D. Feldman, is partner in a $3,000,000 exploration program with PREPA. Feldman's operating subsidiary is Transworld Petroleum, S.A.F.

Algerian terrorists tried to sabotage refining and bulk plant facilities in France this summer. But damage for the most part was limited to tank fires.

WEST GERMANY

THE PROSPERING West German oil industry has been highlighted by the opening of a crude pipeline from Wilhelmshaven to Cologne.

The 230-mile, 28-in. system from the North Sea is enabling refiners to expand capacity in the Rhine-Ruhr area, the heaviest marketing region in the country. The line can move up to 200,000 bbl. daily with one pumping station. Capacity will be raised to 500,000 bbl. daily with three more stations to be added.

Several local refiners are currently hooking up with the line. Esso AG is finishing a 75,000-bbl. plant at Cologne, which will be supplied by the system. British Petroleum, the other international partner in the operating company, North-West Oil Pipeline, has broken ground for a 100,000-bbl. plant at Dinslaken.

A second crude line into the region is under construction from Rotterdam. The 24-in. trunk to Godorf and Wesel will move 135,000 bbl. daily when it opens in 1960. Owners are Royal Dutch-Shell, Caltex, Socony Mobil, and Gelsenberg Benzin, AG. The line will be a part of the proposed SAPPEUR system which may some day link Marseille and Rotterdam.

Shell is building an 85,000-bbl. refinery at Godorf, and it has expanded its plant near Hamburg to 65,000 bbl. daily. Esso plans to expand its new Cologne plant to 160,000 bbl. daily later. Petrofina will open a 21,000-bbl. Purfina Mineraloelraffinerie plant at Duisberg next year.

Tidewater Oil Co. has canceled its plans for a plant in the Lower Rhine Valley. Gottlieb Duttweiler, head of a Swiss cut-rate marketing firm, still plans to build a refinery at Emden, but he has so far been unable to get permission from proper authorities.

Crude producers are hurrying to take oil out of the ground before protective tariffs are removed under the common market agreement. When protection ends in 6 years, exploration faces a sharp cutback unless a subsidy system is put into effect.

Operators have pushed output above 89,000 bbl. daily and have successfully added to reserves, keeping the country well in front as the leading oil country in western Europe. Production comes from 77 small fields, with the largest, Ruehlmoor, averaging less than 9,000 bbl. daily.

WEST GERMANY PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping	Daily	Cumulative	
Bavaria						
Albaching, 1958	8,200	....	....	....	666	....
Ampfing, 1954-Muehldorf-Sued, 1958	5,900-6,100	9	....	1,078	469,276	20
Heimertingen, 1954	5,000-5,200	....	10	75	116,876	33-37
Isen, 1954	6,500-7,000	....	....	....	28,228	18
Moenchsrot, 1958	4,800-4,850	....	2	162	10,578	....
Tegernsee, 1883	....	....	....	....	32,221	....
Total		9	12	1,315	657,845	
Emsland						
Adorf, 1956	4,000-4,200	....	1	....	50,721	30
Emlichheim, 1944	2,400-9,400	....	107	2,941	10,243,082	25
Frenswegen, 1958	1,280	1	....	....	269	....
Georgsdorf, 1944	1,600-3,300	303	129	5,604	15,403,885	24-29
Hebelermeer, 1955	3,950-4,000	2	2	30	31,279	30
Lingen, 1942	2,300-3,900	....	242	2,367	8,606,250	30-32
Ruhlermoor, 1949	2,000-4,000	5	195	8,150	14,714,796	25
Ruhlertwist, 1949	2,350-2,900	....	....	2,887	7,059,553	25
Scheerhorn, 1949	2 500-3,900	....	93	2,685	4,922,023	....
Total		311	769	24,664	61,031,858	
Hamburg						
Hohernhorn, 1954	7,900	....	....	....	2,351	....
Reitbrook, 1937	1,400-5,500	62	57	914	11,687,707	....
Total		62	57	914	11,690,058	

Hanover

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Blumenhagen, 1957	443		1		850	
Broistedt, 1937	2,460		8	163	478,126	35
Calberlah, 1945	160-400		8	7	56,755	22
Eddesse, 1896	500-3,300		57	807	3,581,375	26-34
Eicklingen, 1937	1,650-3,100		26	215	2,386,866	32-33
Eilte, 1947	3,560-3,700		1	201	51,988	23
Eilte-West, 1956	5,676		7	723	202,212	35
Eldingen, 1949	4,900-5,300	2	44	1,786	4,873,461	35
Fuhrberg-Hambuehren, 1939	260-2,170			615	5,590,290	22-23
Gifhorn, 1935	650-1,000		24	25	399,057	16
Hademstorf, 1941	4,100-5,400		8	67	814,774	25-29
Hankensbuettel, 1954	5,026-5,105	46	11	6,377	6,216,219	33
Hardesse, 1957	6,070	3		23	18,833	34
Hillerse-Nord, 1958		1		47	2,152	
Hohenassel, 1943	1,450-2,100		36	353	2,339,458	31
Hohne, 1951	4,495	22	23	4,220	7,560,966	33-34
Lehrte, 1952	3,914-4,026	8	36	1,141	1,306,741	31
Leiferde, 1956	2,700-2,736	19	2	1,284	494,757	34
Lueben, 1955	4,200	9	1	952	639,515	35
Meckelfeld, 1938	1,000-8,600			288	497,745	24-32
Meerdorf, 1954	5,565-5,574	6		39	19,972	42
Moelme, 1935	160-4,500	4	4	143	1,118,909	32
Nienhagen, 1899	600-5,350		290	2,325	39,679,768	22-32
Oberg, 1918	500-1,900		37	108	2,737,886	36-46
Oerrel-Sued-Wesendorf-Nord, 1954	4,460-4,700		116	1,246	1,014,054	
Rautheim, 1955	330		1	3	4,708	
Rietze, 1956	6,000	1			2,032	
Ruehme, 1954	1,985-2,297		36	580	712,481	
Steimbke, 1936	790-3,700		196	776	7,665,955	18
Stemmerberg, 1948	4,000				1,119	16
Suderbruch, 1949	3,800-7,650	1	77	2,921	8,175,560	19-38
Thoeren, 1941	1,550-4,100		51	265	2,044,067	31
Vechelde, 1954	6,000				15,604	31
Vorhop, 1952	5,085-5,197	12	2	1,078	1,031,365	36
Wesendorf, 1943	1,200-6,300		86	1,147	6,635,050	17-42
Wietze, 1879	300-1,000		35	492	18,422,599	
Total		134	1,224	30,417	126,793,269	

Schleswig-Holstein

Boostedt-Ploen, 1952	5,500-6,300	4	37	3,412	5,818,875	29-34
Bramstedt, 1954	6,231-6,503	11	9	2,323	1,937,725	34-35
Heide, 1935	2,600-5,900		85	1,345	13,520,181	21-32
Kiel, 1955	5,750-5,800		13	281	263,575	32
Schwedeneck, 1956	5,128			434	132,616	25
Warnau, 1957	8,200		1	39	14,946	35
Total		15	145	7,834	21,687,918	

Upper Rhine Valley

Dudenhofen, 1952	5,500-6,300	1			7,307	26-27
Forst-Weiher, 1934	1,200-2,600			18	671,930	32-34
Hayna, 1957	4,500-4,700		1		10,811	39
Huttenheim, 1936	5,300		1	17	15,746	31
Landau, 1955	3,400-6,400		36	1,526	698,258	36
Leopoldshafen, 1957	3,100-4,000	2	4	187	41,588	40
Minfeld, 1956	2,700	1	6	152	43,506	
Offenbach, 1958	3,520	2	1	24	1,699	36
Rot, 1953	2,100-2,500		14	95	337,447	25-26
Stockstadt, 1952	1,600-5,600		24	867	1,228,189	39
Wattenheim, 1954	7,500		1	52	41,262	
Weingarten, 1936	800-3,600		80	32	465,071	31-34
Total		6	168	2,970	3,562,814	

Weser-Ems

Barenburg, 1953	2,300-2,550	23	17	2,514	2,668,120	29
Bockstedt, 1954	3,900		10	407	498,651	
Bramhar, 1958	2,560-2,900	2			771	29
Dickel, 1953	2,953-4,593		3	177	68,223	
Dueste, 1954	2,800-4,200	3	152	5,927	6,716,668	
Elsfleth, 1956	5,095-5,138		9	419	141,097	26
Etzel, 1942	4,550-4,700		4	37	374,729	13
Hemmelte-West, 1951	3,700-4,500	12	41	2,413	5,136,123	32
Liener-Garen, 1953	2,600-4,500		12	108	288,471	28-31
Molbergen, 1953	2,400-5,200		18	217	423,847	26
Ortland, 1956	5,350	7	8	676	57,714	32
Ostenwalde, 1953	4,200-4,960		27	537	329,161	

WEST GERMANY PRODUCTION (Continued)

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Oythe, 1956	3,700	....	2	10	14,167	28.5
Quakenbrueck, 1950	1,270-1,950	....	7	36	296,786	35
Siedenburg, 1956	2,300-6,600	....	13	294	149,997	25.5
Varel, 1957	5,210	1	....	106	14,124	28-29
Vechta, 1955	5,200-6,500	2	14	1,109	322,018	39
Voigtei, 1953	1,500-1,700	1	83	3,477	2,686,258	31-34
Wehrbleck, 1957	3,380	1	1	69	10,047	
Wettrup, 1958	3,300	1	....	.....	878	29
Total		53	421	18,637	20,164,423	
Total West Germany		590	2,796	86,751	245,588,185	

WEST GERMANY REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Badische Anilin & Soda-Fabrik AG, Ludwigshafen, Oppau	1,000	.....	.....	.....	210 L
B.P. Benzin Petroleum G.m.b.H.: Hamburg	43,000	4,500	.....	6,000 Pf 3,200 T	7,000 V, 6,500 BPH, 1,500 A
Dinslaken	(1)	.....	.....	.....	.....
Deutsche Erdoel-AG, Wietze Heide	800	.....	.....	.....	.....
	18,000	.....	7,700 TCC	3,400 Pf	1,600 L, 320 Poly
Deutsche Shell AG: Monheim/Reisholz	5,000	.....	.....	.....	.....
Harburg/Wilmhelmsburg/Grasbrook	15,000	.....	.....	2,300 Pf	
Harburg	40,000	.....	.....	7,800 Pf	12,000 CH, 4,100 L
Godorf	(2)	.....	.....	.....	.....
Esso AG: Hamburg-Harburg	54,000	.....	11,600 FCC	6,400 FHy	1,500 L, 8,400 H
Cologne	(3)	.....	.....	.....	.....
Gelsenberg Benzin AG, Gelsenkirchen	70,000	.....	9,700 TCC	6,400 CR	510 Poly, 15,400 H
Gewerkschaft Deurag-Nerog, Misburg	17,000	5,600	.....	2,800 Pf 2,600 T	1,800 L, 180 Poly
Gewerkschaft Erdoel Raffinerie Emsland, Lingen-Holthausen	18,000	.....	18,500 HD	2,800 CR 3,000 HF	770 Poly
Gewerkschaft Grief Bergbau Mineraloelraffinerie, Dollbergen	500	.....	.....	.....	.....
Gottlieb Duttweiler, Emden	(5)	.....	.....	.....	.....
Kraftstoff-Hendelsgesellschaft G.m.b.H., Essen-Altenessen	1,700	.....	.....	.....	.....
Mineraloel and Asphaltwerke AG, Ostermoor on Kiel-Canal	3,000	.....	.....	.....	.....
Mineraloel Albert Sengewald, Dedenhausen	900	.....	.....	.....	.....
Mineraloelwerke Peine, Peine	400	.....	.....	.....	.....
Mobil Oil AG in Deutschland, Bremen	28,600	.....	8,000 TCC	3,700 CR	700 L, 5,000 CH
Oelwerke Julius Schindler G.m.b.H., Hamburg-Neuhof	5,600	.....	.....	.....	400 L, 200 A
Purfina, Duisburg	(4)	.....	.....	.....	.....
Ruhrbau G.m.b.H., Muelheim	6,000	.....	.....	.....	.....
Ruhrchemie AG, Oberhausen/Holten	8,000	.....	5,600 TCC	1,800 CR	.....
Ruhroel G.m.b.H., Bottrop-Welheim	2,600	.....	.....	800 T	.....
Scholven-Chemie AG, Gelsenkirchen-Buer	22,000	.....	5,100 FCC	2,100 CR	180 Poly, 9,700 H
Union Rheinische Braunkohlen Kraftstoff AG, Wesseling	43,000	11,800	.....	5,700 CR 4,700 T	430 Poly, 9,700 H
Wintershall AG, Salzbergen	2,300	.....	.....	.....	450 L
Zeller & Gmelin, Eislingen/Fils	170	.....	.....	.....	.....
Total	406,570	21,900	66,200	65,500	

(1) Building 100,000-bbl. refinery, including 8,500 bbl. cat reformer and 7,500-bbl. BP Hydrofiner. (2) Building 85,000-bbl. refinery. First 40,000-bbl. capacity due completion mid-1960. (3) First 75,000 bbl. of planned 160,000-bbl. refinery due completion early 1959. Will include 7,500-bbl. Powerformer, 14,000-bbl. Hydrofiner. (4) Building first 21,000 bbl. of planned 65,000-bbl. refinery. (5) Proposed 30,000-bbl. refinery.

GREECE REFINING

(Barrels per stream day)

Company—Refinery location— Oil Transport Trading & Refining Co.,	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Aspropyrgos	30,000	.....	.....	8,200 Cat	500 A
Total	30,000	.....	.....	8,200	

ITALY (INCL. SICILY)

SICILY is still the mainstay of Italian crude production, with output from Gulf Oil's Ragusa field now supplemented by Gela, operated by the government's Ente Nazionale Idrocarburi.

Gulf produces 22,000 bbl. daily from 36 wells in Ragusa, which covers 3,300 proved acres. The company is continuing its drilling program, with four development wells and four wildcats the second half of the year.

E.N.I.'s affiliate, AGIP Mineraria, has four rigs drilling in Gela, where 8.8°-gravity crude is pumped from 10,800 ft. A gathering system serving 10 wells has been built, and a 14-in. offtake line is to move crude to the coast. Enrico Mattei, volatile head of E.N.I., says the field may produce 60,000 bbl. daily. A field topping plant has been opened. Asphalt is sold locally, and light ends are recycled to help produce the heavy crude.

On the Italian mainland, E.N.I. is having slower going. A drilling program on the leg of the Italian boot has not yet found oil to supplement small output in the Po Valley. E.N.I.'s gas production in the Po region earlier this year had risen less than 2% over last year.

There has been little interest in the country since the passage of the stiff oil law which prompted Gulf's withdrawal from the mainland last year. There is still limited activity by private firms, however. Cities Service, with an interest of 90,000 acres in southeastern Italy, has opened a geological office in the country.

J. P. Getty has acquired an interest in a 30,000-bbl. refinery owned by GOLFO in southern Italy. The plant is to be expanded, and it will operate on crude produced by Getty Oil in the Neutral Zone.

The country's petrochemical industry based on natural gas is growing. A new complex going into operation at Ravenna will produce 750,000 tons of nitrogen fertilizer, and 60,000 tons of synthetic rubber per year. The plant is owned by ANIC, a subsidiary of E.N.I.

ITALY PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Cortemaggiore, 1949	5,000-6,380	26	....	1,018	3,029,998	36.9
Ripi, 1915	730	....	....	(*)	....	....
S. Giorgio, 1943	3,000	....	....	(*)	....	....
Tramutola, 1936	680	....	....	(*)	....	....
Ragusa (Sicily), 1954	5,750	....	36	22,000	15,650,000	19.3
Gela (Sicily)	10,800	2	4	4,474	754,637	8.8
Alanno, 1956	1,700	19	3	762	532,527	20.6
Bussefo, 1956	4,930	2	....	118	90,204	41.0
Total		49	43	28,372	20,057,366	

*Shut in.

ITALY REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
AGIP Mineraria SPA:					
Gela	2,500	....	....	....	....
Cortemaggiore	3,000	....	2,000 TCC	....	....
Anonima Petroli Italiani (API), Falconara	26,000	4,000	....	2,700 CR	....
Aquila Societa Technico-Industriale, Trieste	25,000	....	5,000 TCC	3,000 T 5,000 Pf	4,500 V, 5,000 Un, 1,400 Poly, 6,500 L, 2,000 A
Asfalti Bitumi-Catramie Derivati, Ragusa	100	....	....	....	....
Bianchi Petroli, Cologno Monzese	1,500	....	....	....	....
Condor SPA per l'Industria Petrolifera y Chimica, Rho	45,000	....	12,000 TCC	6,000 Pf	6,000 CH, 400 Poly
Delle Piane, Genoa	1,000	....	....	....	....
Distilleria Italiana Catrami (DICA), Carrara	9,200	500	....	....	350 Cy
Esso Standard Italiana (SIAP), Trieste	6,000	....	....	1,000 Pwr	1,800 V, 470 L, 1,360 A
Garrone, Genoa	25,800	....	....	5,600 Pwr	2,000 Hyd, 300 L, 450 A
Industria Chimica Italiana del Petroleo (ICIP), Mantova	20,000	....	....	2,000 Pf	....
ILSEA, Como	2,700	300	....	500 Cat	....
IPLOM, Genoa[1]	7,000	....	....	1,000 CR	....
Industria Raffinaria Oli Minerali (IROM), Porta Marghera (Venice)	35,000	....	....	7,600 T 2,000 Pf	7,000 V, 1,600 Poly, 300 L, 450 A
Italia Raffineria Olii Minerali, SPA, Cremona	29,300	....	....	3,500 T 800 Cat 650 T	(2)
Lombardia Petroli, Milan	5,800	....	....	....	....
Mobil Oil Italiana, Naples	85,000	....	13,500 TCC	7,100 T	900 Poly, 10,000

ITALY REFINING (Continued)

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
				10,000 CR	CH, 300 L
NILO, Milan	10,000			1,000 T	
Petroli d'Itali Fiorenzuola d'Arda	4,000	1,800		720 T	
Purfina Italiana, SPA:					
Genoa	11,000		1,800 TCC	1,500 CR	1,100 A
Milan	8,000			500 T	3,000 V, 500 L, 1,000 A
Rome	[3]11,000		1,800 TCC	720 CR	1,250 A
Raffineria Oli Lubricanti (ROL), Viguzzolo	1,400				380 L
Raffineria Siciliana Oli Minerali, (RASIOM), Augusta	90,000	4,500		6,200 T 7,300 Pwr	1,500 A, 1,000 Poly
Raffineria Volpato, Milan	2,100				
San Quirico, Genoa	4,500				
S.A.R.O.M., Ravenna	48,000	5,000 Vis		2,000 T 4,000 HF 3,000 Pf	
Soc. Golfo Industria Petrolifera, Gaeta	[4]30,000				
Sta. per Azioni Raffineria Padana Oli Minerali (SARPOM), Novara	22,000		4,600 FCC	4,000	9,500 V, 430 Poly
S.I.R.O.M., Milan	1,500				
Sta. Petrolifera Italiana, Fornovo Taro	2,500			1,500	
Sta. per l'Industria del Petroleo (INPET), La Spezia	35,000			3,000 T 6,700 Pf	
Stanic Industria Petrolifera:					
Bari	5[1],000			7,300 Pwr	8,000 Hyd, 700 A
Leghorn (Livorno)	46,000			4,000 T 8,900 Fhy	7,950 Hyd, 1,800 L, 1,200 A
S.T.O.I., Florence	15,000			600 T 1,200 CR	
Total	722,900	16,100	40,700	122,590	

(1) Building 10,000-bbl. crude unit, 2,000-bbl. Platformer. (2) Building 400-bbl. cat poly unit. (3) Plan new 30,000-bbl. plant to replace this refinery. TCC unit to be moved and increased to 2,500 bbl. (4) Expanding plant to 40,000 bbl. daily.

NETHERLANDS

TWO MAJOR refinery-construction projects are under way in the Netherlands.

Esso Nederland is building a new 95,000-bbl. plant at Rotterdam, and Caltex is more than doubling its Pernis plant by adding 59,000 bbl. capacity. Esso expects to put its plant on stream in 1960.

Royal Dutch-Shell, whose Pernis plant is the largest in Europe, is investing in downstream processing facilities and in petrochemical expansion. This year the plant became the first in Europe to make high-octane blending components for aviation gasoline when it opened a 2,800-bbl. alkylation unit. The country's first synthetic-rubber plant will open at the refinery in 1960, producing 50,000 tons per year.

Crude production has risen to 31,000 bbl. daily from concessions held jointly by Royal Dutch and Standard Oil Co. (N. J.). More than two-thirds of the output is from Schoonebeck field in West Central Holland, where output is held up with a secondary-recovery and pressure-maintenance program. Remaining output comes from a group of small fields in the Rotterdam area.

NETHERLANDS PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping*	Production in bbl.: Daily†	Production in bbl.: Cumulative	Gravity °API
Alblasserdam, 1957‡	4,800			7	12,214	25.6
Andel, 1953	3,900-4,700				5,948	26.4
Berkel, 1954	3,600		3	75	98,278	32.2
Delft, 1954	3,800		3	33	85,656	32.2
De Lier, 1955	5,300	7	5	1,094	684,507	35.0
Ijsselmonde Ridderkerk, 1956	3,100-4,800	11		1,027	400,731	19.0
Moerkapelle, 1957	2,450-4,390		3	38	6,886	15.5
Monster, 1957	5,500		1	20	5,004	34.7
Pijnacker, 1955	5,800	7		1,350	1,078,937	36.0
Rijswijk, 1953	5,100	3	6	1,584	1,546,879	31.9
Schoonebeek, 1943	2,500		277	22,872	62,798,816	25.1
Wassenaar, 1956	4,100	9	1	1,214	735,286	18.0
Werkendam, 1958	6,530		1			
Zoetermeer, 1957	3,150	2	1	358	136,361	18.0
Total Netherlands		39	301	29,672	66,860,217	

*Includes all artificial lift. †Daily average first 6 months. ‡Shut in.

NETHERLANDS REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Caltex Pet. Maatschappij (Nederland) N.V., Pernis	149,000	9,000	.....	7,500 7,500 Pf	950 Poly, 12,000 Un
Esso Nederland, Rotterdam	(2)	.....	.....	.....	.....
N.V. de Bataafsche Petroleum Mij., Pernis	300,000	20,000	66,000 FCC	10,000 T 12,700 Pf	24,200 H
Total	349,000	29,000	66,000	37,700	

(1) Adding 59,000-bbl. crude unit. (2) Building 95,000-bbl. calendar day refinery to include Powerforming and Hydrofining. Completion in 1960.

SPAIN AND PORTUGAL

REPORTS that Spain is on the verge of passing a new oil law have not yet materialized.

The law shaping up will be based on the standard 50-50 profit split, with licenses issued for 6 years. In case of a commercial discovery, half the acreage on a permit will revert to the government. Exploitation rights at the find will run for 40 years, with a 10-year extension option.

Exploration has been comparatively slow because of restrictions. But Spain is spending 72% of its foreign exchange for oil, and there is growing pressure for stepped up oil play on its own soil.

Two rigs are being shipped in by a West German firm, Deutsche Schachtbau, for tests on acreage held by Petrolifera Iberica. Another German company, Deilmann Montan, is drilling in partnership with a local firm, CIEPSA. The company with the largest interest of any American firm is General American Oil, which participates in Valdebro.

No major additions are planned at Spain's two major refineries. The CEPSA plant at Tenerife in reality is far removed from Europe, located in the Canary Islands several hundred miles southwest of Spain off Africa. The Escombreras plant, lying on the Mediterranean, is conveniently located for imports of Middle East crude. Caltex has 24% interest.

Portugal's inland demand is largely supplied by the SACOR plant near Lisbon, owned jointly by the government and private local interests. Exploration is being carried on by an affiliate of Socony Mobil. The government and Axel Johnson interests, of Sweden, have shares in the program.

SPAIN REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Cia. Arrendataria del Monopolio de Petroleos, Hospitalet	700	.....	.....	.....	.....
Cia. Espanola de Petroleos, S.A., Santa Cruz de Tenerife, Canary Islands	60,000	3,500 Vis	.....	5,000 Pf	3,000 V, 500 L, 2,000 A
Refineria de Petroleos de Escombreras, S. A., Escombreras	84,000	.....	.....	11,000 Pf 9,000 T	460 Poly
Total	144,700	3,500	.....	25,000	

PORTUGAL REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Salor, S.A., Lisbon, Cabo Ruivo	22,900	.....	10,600 TCC	.....	1,400 Poly, 190 L
Total	22,900	.....	10,600	.....	

SCANDINAVIA

THREE refinery projects are under way in Scandinavia. Esso is building a 40,000-bbl. grass-roots plant south of Oslo, Norway. In Sweden, two local companies are expanding existing plants. A. B. Nynas is adding 21,000 bbl. capacity at Nynasham, and Kopportranz is adding 40,000 bbl. at Sharuik.

More than 21 dry holes have been drilled in Denmark in an exploration program that was taken over by Standard Oil Co. (N. J.) from Gulf Oil Corp 2 years ago.

DENMARK REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
A/S Dansk Mineraloliefabrik—Copenhagen	60	.....	.....	.....	60 L
A/S Kalundberg Olienaffinaderi—Kalvanborg	500	.....	.....	.....	.....
L. C. Glad Co.—Copenhagen	70	.....	.....	.....	.....
Total	630	.....	.....	.....	

NORWAY REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
A/S Esso-Raffineriet, Norge—Slagenslagen a Naess	(1)	.....	.....	.....	.....
Norske Esso A/S—Valloy Pr. Tonsberg	2,000	.....	.....	.....	300 L
Total	2,000	.....	.....	.....	

(1) Building 40,000-bbl. refinery to produce full range of products. Completion 1960-61.

SWEDEN REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
A. B. Nynas-Petroleum: Nynasham	[1]14,000	1,000	.....	1,900 T	2,500 V, 650 L, 1,900 A
Malmo	1,950	.....	.....	.....	.....
Gothenburg	2,900	.....	.....	.....	.....
Kopportranz Oljeaktiebolag—Sharuik	[2]29,000	.....	.....	4,400 T 5,500 Cat	.....
Total	47,850	1,000	.....	11,800	

(1) Increasing crude capacity to 35,000 bbl., adding 6,850-bbl. Platformer and 1,400-bbl. lube unit. (2) Adding 40,000-bbl. crude capacity, plus 8,000-bbl. Shell hydrodesulfurization unit.

FINLAND REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Neste Oy Corp., Turku	23,000	.....	[1]12,800 TCC	3,400 Cat	12,000 V, 500 Poly, 1,500 A
Total	23,000	.....	12,800	3,400	

(1) 8,300-bbl. fresh feed.

UNITED KINGDOM

AN EVENT of historical industry importance will take place in Britain soon when the first shipment of frozen natural gas arrives by tanker.

Facilities have been completed in England for the handling of liquefied methane. Initial shipments will be brought from Louisiana by a specially fitted tanker owned by the British Gas Council and Constock International Methane, Ltd. If the pilot program works out, it will usher in a new era of marketing by making gas from remote fields available to overseas consuming centers.

Refining capacity continues to grow, and the country has moved well ahead of France as the leading processor in western Europe. New projects which have opened this year include a 90,000-bbl.-daily distillation unit at British Petroleum's Kent refinery, an 80,000-bbl. unit at Shell Refining's Shell Haven plant, and a 50,000-bbl.-daily unit at Esso's Fawley plant.

Esso has awarded a construction contract for a 100,000-bbl. grass-roots refinery at the deep-water port of Milford Haven, Wales. BP also is taking advantage of the port, which can handle tankers of the 100,000-ton class, by building a new jetty and a 60-mile, 18-in. crude pipeline to its Llandarcy refinery.

British crude production holds steady at about 1,700 bbl. daily from several small fields in the Midlands area. Exploration work is in progress, however, and an airborne-magnetometer survey over the northern midlands and part of the Irish Sea has just been completed.

Ireland . . . A 39,600-bbl. plant at Whitegate, County Cork, will be opened next year by Irish Refining Co. The owners are Esso, Caltex, Shell Mex and British Petroleum. Exploration is to be started by two American independents who are getting a concession over the entire country. They are Ambassador Oil Corp. and Messman-Rinehart Oil Co.

UNITED KINGDOM PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Bothamsall, 1958	3,215-3,256	....	1	28	1,600	40.4
Caunton, 1943	2,000-2,200	....	10	22	239,000	27.8
Corringham, 1958	4,385-4,433	....	1	14	.....	39.1
Duke's Wood, 1941	1,800-2,500	....	94	393	3,615,000	33.6
Eakring, 1939	1,800-2,500	....	27	156	1,941,000	33.6
Egmanton, 1955	3,100-3,400	....	34	754	418,000	39.1
Formby, 1939	85-130	....	8	2	72,000	34.1
Kelham Hills, 1941	2,000-2,500	....	40	188	1,781,000	27.8
Langar, 1958	.....	....	1	1	260	28.0
Plungar, 1953	2,800-3,080	....	7	64	98,000	32.2
Total		....	223	1,622	8,165,860	

UNITED KINGDOM REFINING

England
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Berry Wiggins & Co., Ltd.:					
Kingsnorth on Medway, Kent	3,600	.....	.....	.....	2,400 V, 300 L, 1,600 A
Weaste	3,600	.....	.....	.....	2,000 V, 250 L, 1,200 A
B.P. Refinery (Kent), Ltd., Isle of Grain	200,000	.....	12,500 FCC	12,000 T 16,000 Pf	34,000 V, 10,000 CH,[1] 2,250 Alky, 2,750 L
Esso Petroleum Co., Ltd., Fawley	[2]241,300	.....	49,000 FCC	6,000 T 15,000 Fhy	71,600 V, 29,500 Hyd, 4,000 Poly, 2,800 L, 2,080 A
Lobitos Oilfields, Ltd., Ellesmere Port	4,200	800	.....	800 Pf	1,100 V, 650 L, 150 A
Manchester Oil Refg., Ltd., Manchester	3,500	.....	.....	.....	2,500 V, 1,500 L
Mobil Oil Co., Ltd., Coryton	35,000	.....	9,500 TCC	5,400 CR	3,000 L, 15,000 V
Shell Refg. & Marketing Co., Ltd.:					
Heysham	36,000	6,000 Vis	.....	4,000 T	.....
Androssan	3,200	.....	.....	.....	.....
Shell Haven	160,000	.....	.....	13,000 T 6,700 Pf	[3]
Stanlow	105,000	.....	33,000 FCC	13,000 T 10,000 Pf	.....
Total	795,400	6,800	104,000	101,900	

(1) Adding 10,000-bbl. catalytic hydrogenation unit for completion end 1958. (2) Adding 3,100-bbl. atmospheric crude unit, 1,500-bbl. vacuum unit, 21,000-bbl. Powerformer, 1,440-bbl. lube capacity, and 1,380-bbl. asphalt capacity. (3) Plan 16,000-bbl. hydrodesulfurizer for completion early 1960.

Scotland

Grangemouth Petroleum Ref., Grangemouth	[1]49,000	.....	12,500 FCC	.....	17,000 V, 500 CH, 2,200 Poly
Scottish Oils, Ltd., Pumperston	3,500	1,500	.....	.....	15 C[2]
Total	52,500	1,500	12,500	.....	

(1) Adding 35,000-bbl. crude unit due for completion early 1959. (2) Tons daily.

Wales

BP Refinery (Llandarcy), Ltd., Llandarcy	70,000	.....	12,500 FCC	6,000 Pf	24,000 V, 3,500 CH, 2,000 L, 500 A
Esso Petroleum Co., Ltd., Milford Haven	(1)	.....	.....	.....	.....
Total	70,000	.....	12,500	6,000	

(1) 100,000-bbl.-daily plant under construction; to include 16,500-bbl. Powerformer and 16,500-bbl. Esso Hydrofiner. Due for completion 1960-61.

Ireland

Esso, Cal-Tex, Shell Mex. and BP, Whitegate	(1)	.....	.....	.....	.....

(1) Building 39,600-bbl. refinery to include 9,000-bbl. Powerformer, 5,380-bbl. Hydrofiner.

Total United Kingdom	917,900	8,300	129,000	107,900

MIDDLE EAST

BAHRAIN

DESPITE huge crude production elsewhere in the Persian Gulf, a gain in output to more than 40,000 bbl. daily on Bahrain Island has been noteworthy because output for years had been pegged at 30,000 bbl. daily. Bahrain Petroleum Co., a member of the Caltex group, has made the increase with a one-rig drilling-development program in the Bahrain zones. There is no wildcatting under way at the present time.

The island's big refinery, fed largely by a crude pipeline from Saudi Arabia, continues to be among the largest processing facilities in the Persian Gulf. High-octane blending component is now being made at the plant from the first UOP Platforming-Unifining unit in the Middle East.

BAHRAIN PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Bahrain Zone, 1932	2,200	144	....	39,034	203,702,389	32
Fourth Pay, 1936	4,500	3	....	623	3,022,808	36
Total		147	....	40,657	206,725,197	

BAHRAIN REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking Thermal	Cracking Catalytic	Reforming	Other processing
Bahrain Petroleum Co., Ltd., Bahrain*	186,500	16,020 19,950 Vis	27,300 FCC	10,450 Pf	34,020 V, 10,450 UN, 2,050 Poly, 1,990 A
Total	186,500	35,970	27,300	10,450	

*All figures on calendar-day basis.

IRAN

INDIANA STANDARD made the industry's eyes pop this year when it won a choice Persian Gulf concession from Iran when it agreed to give half the profits to the government and split the remainder with a government company. It also threw in a $25,000,000 bonus, and promised to spend $82,000,000 in exploration the first 12 years.

Pan American International, Indiana's subsidiary, expects to start its first well on the 6,000-sq. mile block next year.

Iranian Oil Exploration & Producing Co., one of the two operating companies for Iranian Participants, held by the consortium group, has had a $140,000,000 expansion program under way. Highlights are a 26-28-in. pipeline from Gach Saran to Kharg Island, and a new terminal on the island.

A spectacular well fire at 6 Ahwaz burned for 44 days before being tamed. The well blew 100,000 M.c.f. of gas daily, and may have tapped a new field in the consortium area.

IRAN PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells* Flowing	No. of wells* Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Agha Jari, 1937	4,000-10,000	24	....	482,000	941,663,389	34.2
Alborz (Qum), 1956	7,800	(†)	....	....	....	....
Gach Saran, 1928	2,800-10,000	4	....	59,000	163,775,596	32.0
Haft Kel, 1928	1,900-4,900	20	....	146,000	1,120,681,023	37.7
Lali, 1938	4,000-9,000	4	....	18,000	27,359,439	36.1
Masjid-i-Sulaiman, 1908	680-5,300	19	....	37,000	916,853,529	37.4
Naft Safid, 1935	3,000-7,000	14	....	61,000	72,500,137	35.0
Naft-i-Shah, 1935	2,100-3,300	3	....	5,220	36,528,652	41
Total Iran		88	....	808,220	3,279,361,765	

*Another 317 wells in country shut in. †Iran Oil Co. discovery not on production. Two rigs active attempting to establish commercial field.

IRAN REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking Thermal	Cracking Catalytic	Reforming	Other processing
Iraanse Aardolie Raffinage Maatschappij N.V. (Iranian Oil Refining Co.):					
Abadan	415,000	.....	35,000 FCC	81,000 T	74,000 V, 5,000 A, 10,000 Alky, 450 L
Masij-i-Sulaiman	75,000	.....	.....	.....	.....
National Iranian Oil Co., Kermanshah	3,000	.....	.....	.....	.....
Total	493,000	.....	35,000	81,000	

ASIA

PRODUCTION AND REFINING CAPACITY

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
Australia		212,200
Aden		120,000
Bahrain	40,657	186,500
Br. Borneo	104,625	44,000
Burma	10,500	9,429
Formosa	39	28,000
India	9,000	110,000
Indonesia	349,944	248,800
Iran	808,220	493,000
Iraq	756,200	55,830
Israel	2,000	87,000
Japan	6,804	553,250
Kuwait	1,376,000	220,000
Lebanon		24,050
Neutral Zone	84,100	50,000
New Guinea	4,924	
Pakistan	5,400	6,000
Philippines		18,000
Qatar	162,000	600
Saudi Arabia	991,314	189,000
Turkey	6,500	6,950

IRAQ

THE OIL INDUSTRY came through unscathed in the July revolution that overthrew the King Faisal government.

Relations between the new regime and the Iraq Petroleum Co. group were quickly established. There was no apparent short-term danger to the established 50-50 profit split, but IPC did agree in principle to give up some of its concession lands.

IPC also agreed to increase crude production, and expansion programs already planned or under way at the time of the revolt, are going forward. A 116-mile looping program on the 30/32-in. main line from Kirkuk field to Banias, Syria, will be completed next year. A new terminal also is being built on Shatt al Arab River at the head of the Persian Gulf. This will enable big, modern tankers to move crude produced in Iraq's southern fields for the first time.

IPC and its affiliates in Iraq, Mosul Petroleum and Basrah Petroleum, neared a record 800,000 bbl. daily late in the year. Most of the gains have been made in Rumaila and Zubair fields in southern Iraq, operated by Basrah Petroleum. Parent companies of the group are British Petroleum, Royal Dutch-Shell, Cie. Francaise des Petroles, and a joint Socony Mobil, Jersey Standard company, each with 23¾%. The Gulbenkian Estate holds the remaining 5%.

IRAQ PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Ain Zalah, 1939	5,800	4	....	17,000	40,706,000	31.7
Bai Hassan, 1953	4,900	(*)	....	....	....	....
Butmah, 1952	4,950	4	....	8,000	6,827,000	30.2
Jambur, 1954	5,700	(†)	....	....	....	....
Kirkuk, 1927	2,750	37	....	502,000	1,499,197,000	36.0
Naft Khaneh, 1923	3,000	2	....	4,200	57,597,034	42.0
Rumaila, 1953	10,800	14	....	152,000	109,485,000	34.7
Zubair, 1949	11,000	21	....	73,000	194,723,000	35.9
Total		82	....	756,200	1,908,535,034	

*Nine wells shut in. †Three wells shut in.

IRAQ REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Government Oil Refineries Administration:					
Baghdad	[2]30,000	15,000 Vis	.....	10,000	15,000 V, 500 L, 200 A[1]
Quaiyarah	[3]3,000	.....	.....	.....	2,000 V, 108 A
Iraq Petroleum Co., Ltd.:					
K. 3 (Haditha)	6,450	.....	.....	.....	.....
Kirkuk	2,880	.....	.....	.....	.....
Khanaqin Oil Co., Ltd.:					
Khanaqin	10,250	.....	.....	.....	.....
Muftieh Depot, Basrah	3,250	.....	.....	.....	.....
Total	55,830	15,000	.....	10,000	

(1) Tons daily. (2) Adding 24,000-bbl. crude unit, 15,000-bbl. vacuum unit, 8,000-bbl. thermal cracker, 15,000-bbl. visbreaker, 5,000-bbl. Powerformer, 6,000-bbl. Esso Hydrofiner. (3) Planned 5,000-bbl. crude unit and 3,000-bbl. thermal reformer.

ISRAEL

MAJOR oil companies have broken their last ties with Israel by the sale of the 87,000-bbl. Haifa refinery.

British Petroleum and Royal Dutch-Shell sold the plant to Paz Oil Co., the private interests which last year bought the marketing facilities of the two com-

ISRAEL PRODUCTION

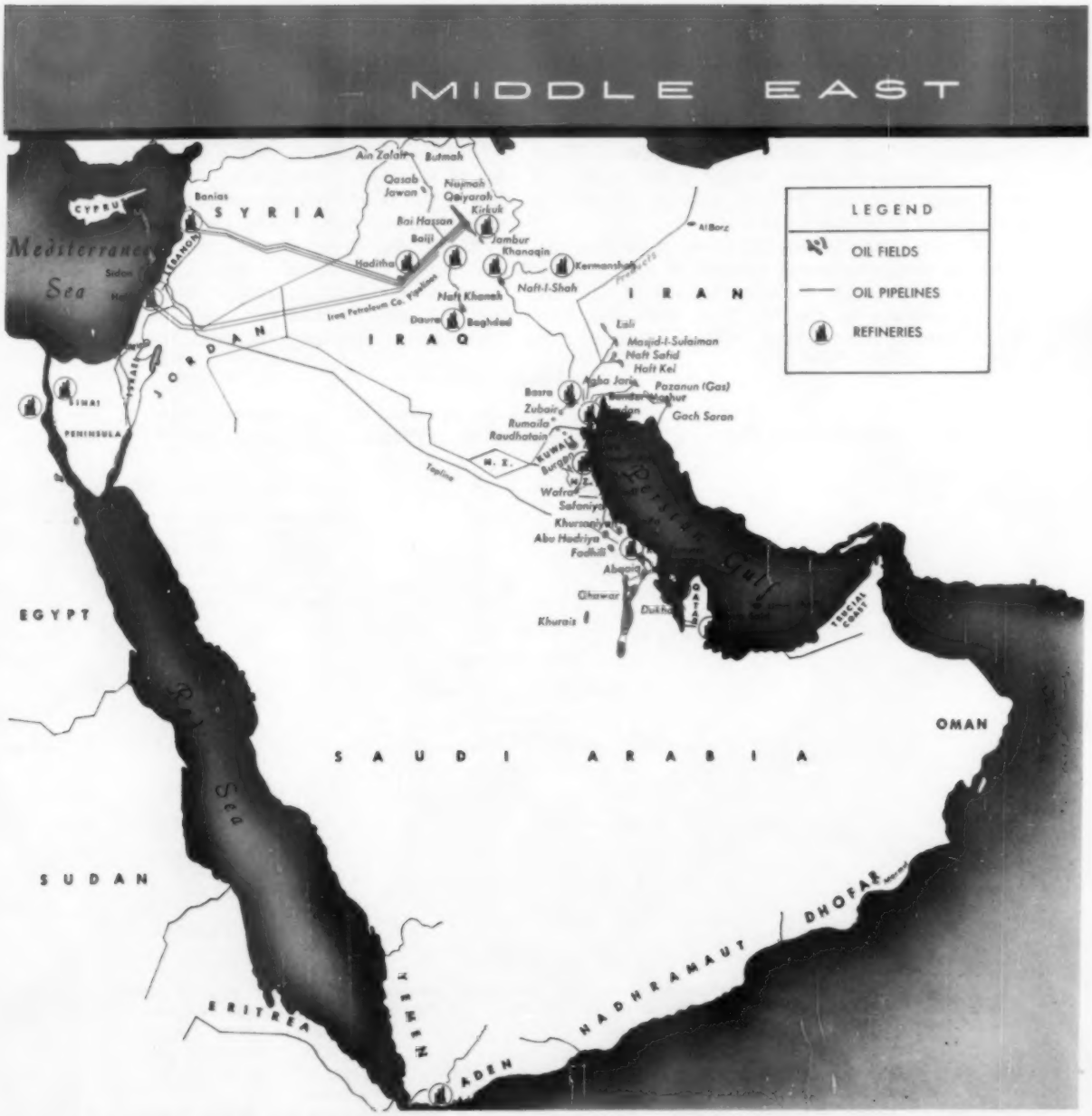
Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Heletz, 1955	5,000	5	15	2,000	820,000	31
Total		5	15	2,000	820,000	

ISRAEL REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Consolidated Refineries, Ltd., Haifa[1]	87,000	.....	.....	20,000 T	5,000 V, 1,000 A
Total	87,000	.....	.....	20,000	

(1) Refinery operating at only about 25% capacity.



panies. Other marketers had pulled out of the country earlier.

The refinery has been filling local demand by operating at about 24,000 bbl. daily since 1948 when Arabs cut the pipeline from Iraq. The plant is now fed by a 250-mile, 8 and 16-in. pipeline from the Gulf of Aqaba.

A 6-in. products line from Haifa to Tel Aviv has been completed. It will move 10,400 bbl. daily to the capital.

Crude output from Heletz, the country's only field, has risen to 2,000 bbl. daily. A national exploration company has been formed to spur exploration, and the Israeli public will be able to buy stock.

KUWAIT

NEW FACILITIES are steadily being added in Kuwait, where more than 20,000 tankers have pulled away with 3 billion barrels of crude in the 12 years since the first cargo was loaded.

The shaikdom is easily holding its own as the leading producer in the Middle East with an output nearing 1.5 million barrels daily. Its producing capacity will be further raised next year when a 63-mile, 30-in. line from Raudhatain field in northern Kuwait opens. A new terminal at North Pier also will open, adding a sudden 1-million-barrel-daily loading capacity.

Present production comes from 276 wells flowing

from Cretaceous sandstone. Kuwait Oil Co., owned jointly by Gulf Oil Corp. and British Petroleum, has three rigs active in the Burgan, Magwa/Ahmadi producing area. Four Burgan wells are shut in, awaiting flow lines.

Three wells are waiting for flow lines in Raudhatain, and seven more holes have been drilled to depth but not perforated. Two rigs are on development work in the 3-year-old field, and another is drilling in last year's northern discovery at Sabriya. One is wildcatting.

Gas reinjection will start next year in Kuwait when a compressor plant opens in Burgan. Initially, 100 million cubic feet daily will be returned to formation.

Another major Middle East refinery went on stream with the addition of 160,000 bbl. to the 30,000-bbl. plant at Mina al Ahmadi. The plant consists entirely of crude distillation. There are no downstream units except for a 4,070-bbl. Platformer.

KUWAIT PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Burgan, 1938	3,500- 4,800	203	.....	1,376,000	2,885,524,675	30-32
Magwa-Ahmadi, 1952	3,500- 4,800	73	.....			30-32
Raudhatain, 1955*	8,000-10,000	.....	.....	.....	.....	...
Sabriya, 1957†	7,200- 7,500	.....	.....	.....	.....	...
Total		276	.....	1,376,000	2,885,524,675	

*3 wells shut in awaiting flow lines; another 7 wells drilled to total depth but not yet perforated. †1 well shut in awaiting flow line.

KUWAIT REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Kuwait Oil Co., Ltd., Mina-al-Ahmadi	190,000	.....	.....	(1)	400 A
American Independent Oil Co., Mena Abdulla[2]	30,000	.....	.....	.....	.....
Total	220,000	.....	.....	.....	

(1) Building 4,070-bbl.-daily Platformer. (2) Processing Neutral Zone crude.

NEUTRAL ZONE

THE JAPANESE FIRM holding offshore rights in the Neutral Zone will start its first wildcat in spring.

Arabian Oil Co. will be setting a precedent with the well by being the first to start drilling on concessions which depart from the standard 50-50 contract. The company plans to drill five wells next year in an area offsetting Saudi Arabia's Safaniya field to the south.

If commercial production is developed, the Japanese will pay the Saudis up to 56% of net profits, and Kuwait, 57%. The two governments awarded Arabian American rights on their respective undivided half interests in the Neutral Zone this year.

The two onshore operators in the zone have increased production to more than 84,000 bbl. daily. Getty Oil Co. has the concession over Saudi Arabia's half interest. American Independent Oil Co. takes the other half of crude production as holder of rights on Kuwait's half interest. Two rigs are being used for development work. There is no wildcatting at present.

NEUTRAL ZONE PRODUCTION

Name of field—Discovery date— Wafra field:	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Burgan, 1953	3,600	*35	.....	40,300	50,300,000	24
Eocene, 1954	1,200	†41	.....	27,300	6,200,000	17
Ratawi, 1955	7,100	‡6	.....	16,500	6,300,000	25
Total		82	.....	84,100	62,800,000	

*41 wells shut in. †11 wells shut in. ‡4 wells shut in.

NEUTRAL ZONE REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Getty Oil Co., Mina Saud	[1]50,000	.....	.....	.....	.....
Total	50,000	.....	.....	.....	

(1) Dual-purpose topping plant. Can be used as stabilizer for removal of hydrogen sulfide.

QATAR

OFFSHORE drilling may resume in the near future on rights in the Persian Gulf area off Qatar held by Shell Co. of Qatar. The company's original 1,900-ton platform was wrecked in a storm 2 years ago when under tow to the location for its third wildcat. A new platform is under construction in a Netherlands shipyard.

Onshore production of high quality crude has risen to nearly 170,000 bbl. daily this year. Qatar Petroleum Co., the operator, is an affiliate of Iraq Petroleum Co.

QATAR PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Dukhan, 1940	6,550	40	.....	162,000	295,715,000	41.7
Total		40	.....	162,000	295,715,000	

QATAR REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Qatar Petroleum Co., Ltd., Umm Said	600	.....	.....	.....	.....
Total	600	.....	.....	.....	

SAUDI ARABIA

A 63-MILLION-DOLLAR investment in oil facilities has been made by Arabian American Oil Co. this year, most of it for gas injection and other programs related to crude production.

The biggest project has been a $29,000,000 gas-injection system for Ain Dar area of Ghawar field. This will inject 200,000 M.c.f. of gas daily into the producing reservoir when it opens next year. Another injection system at Abqaiq is being expanded to increase the return to formation to 210,000 M.c.f. daily from 150,000 M.c.f.

Aramco has completed as producers two wildcat discoveries made last year. The Manifa gives Saudi Arabia its second offshore field. Prolific production comes from two zones, 7,715-7,800 ft. and 7,810-65 ft. One of the pays, Yamama, has not been found elsewhere in the country. The 1 Khurais, 75 miles from the nearest production, was completed with a flow of 3,000 to 4,000 bbl. daily from 5,200 ft. A 4-mile stepout has been successful, and Aramco is continuing to drill.

A new 800-ton mobile drilling platform has been put into action at Manifa. The three-legged outfit was especially ordered for development of the field.

Indiana Standard rejected Saudi Arabian terms for a concession deal that the company was negotiating with the government. Talks continued over a period of 2 years, but the company said Saudi terms were completely unacceptable. The deal would have broken the 50-50 profit split, and given the Saudis a share in refining and marketing profits.

The region involved was in the central part of the country, where Aramco has preferential rights. Aramco's parents are Jersey Standard, California Standard, The Texas Co., and Socony Mobil.

SAUDI ARABIA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Abqaiq, 1941	6,800	51	....	216,847	1,372,651,943	38
Abu Hadriya, 1940*	10,115	....	.....	.....	9,579	36
Dammam, 1936	4,850	†28	.....	39,396	375,404,627	35
Fadhili, 1949*	9,850	....	....			38
Ghawar, 1948	7,125	‡87	.....	675,018	1,338,274,743	35
Khurais, 1957	5,200	(§)	.....	.....	.....	33
Khursaniyah, 1956	6,900	(§)	.....	.....	.....	31
Manifa, 1957	....	(¶)	....	.....	.....	27
Qatif, 1945	7,350	10	.....	20,293	95,254,564	35
Safaniya, 1951	5,560	‖18	.....	39,760	27,686,254	27
Total		194	....	991,314	3,209,281,710	

*One well field shut in. †Includes 3 gas wells. ‡29 wells shut in. §2 Two well fields; both shut in. ¶New offshore discovery, one well shut in. ‖12 more wells shut in.

SAUDI ARABIA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Arabian American Oil Co., Ras Tanura	189,000	.....	.....	26,000 T 15,500 Fhy	15,000 Hyd, 1,000 Poly, 900 A[1]
Total	189,000	.....	.....	41,500	

(1) Building 1,210-bbl. H_2SO_4 alkylation unit.

SOUTHERN ARABIA

ANOTHER Middle East oil field may be in the making on a 12,000-sq. mile concession in the Persian Gulf held by Abu Dhabi Marine Areas, Ltd.

The company's first test[1], Umm Shaif, drilled from a mobile barge 20 miles off Das Island tests at the date of 2,400 bbl. daily of high-quality crude. The field is about 100 miles east of the nearest other production, Dukhan field in Qatar. A second well is now drilling 10,000 ft. west of the discovery. The concession is owned by British Petroleum and Cie. Francaise des Petroles.

A 2,000-bbl.-daily discovery at Marmul in Dhofar last year by Cities Service and Richfield Oil has turned out to be a disappointing, noncommercial find. The companies are continuing to explore on a 32,000-sq.-mile concession with one heavy and one light rig.

Yemen oil play is at a standstill. Yemen Development Corp., an independent U. S. group, has no work under way. Deilmann Montan, a West German company, gave up operations 2 years ago.

Other areas of Southern Arabia, including Aden Protectorate, Muscat other than Dhofar district, and the Trucial Coast are under concession to affiliates of Iraq Petroleum Co. Two rigs have been in action in these areas without success so far. One outfit is working in the Trucial Coast area, and the other in Muscat.

ADEN REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
B. P. Refinery (Aden), Ltd., Aden	120,000			12,000 Pf	3,500 CH
Total	120,000			12,000	

SYRIA, LEBANON, AND JORDAN

THE FIRST major oil move by Syria since joining hands with Egypt in the United Arab Republic has been to cancel a concession held by Syrian-Arabian Oil Co.

The company had made Syria's first discovery on one of 11 tracts covering 770,000 acres in the northeast part of the country. The find, at Karatchok, has several wells rated at 500 to 700 bbl. daily. U.A.R. charged that the 3-year-old company had violated the concession agreement. The firm was formed by an American independent, J. W. MenHall. Atlantic Refining Co. and Portsmouth Steel Co. came in later as partners.

An affiliate of Deutsche Erdoel, a West German firm, has continued its exploration program without interruption. Three rigs are being used on wildcatting in eastern Syria. The government plans to open a 20,000-bbl. plant at Homs next year.

Political unrest climaxed by a civil war in Lebanon had little effect on shipments of crude from pipeline terminals on the Mediterranean. Trans-Arabian Pipe Line Co. shipments from Sidon have averaged about 370,000 bbl. daily, a healthy gain over last year. Iraq Petroleum Co.'s 16-in. line to Tripoli was damaged during rioting in spring, but the 175,000-bbl.-daily flow was diverted to Banias, Syria.

In Jordan, four dry holes have been drilled on a concession over one-third of the country held by Edwin W. Pauley, with Phillips Petroleum holding half interest. Zimeri-Jordanian Oil Co., formed by Jorge Zimeri of Guatemala and U. S. interests, has rights on another third of the kingdom.

A 6,400-bbl. refinery will be built north of Amman by Jordan Oil Refinery Co. A construction contract has been awarded to an Italian firm. The plant will be fed by a 30-mile spur from Trans-Arabian Pipe Line.

JORDAN REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Jordan Oil Refinery Co., Zerqa	(1)				
Total					

(1) 6,400-bbl. refinery contracted to Soc. Nazionale Metanodotti.

LEBANON REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Iraq Petroleum Co., Ltd., Tripoli	11,550				
Mediterranean Refining Co., Beirut, Sidon	12,500			1,400 Pf	
Total	24,050			1,400	

SYRIA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Syrian Government, Homs	(1)				

(1) Building 20,000-bbl. skimming plant, due completion July 1959.

TURKEY

A GROUP of four companies plans to open a 65,000-bbl. refinery at Mersin in 1962. The firms holding an agreement on the project with the Turkish Government are Royal Dutch-Shell, Caltex, British Petroleum, and Socony Mobil. A 16,600-bbl. plant has been proposed for Instanbul by an independent company, Turkish American Oil.

American Overseas Petroleum has drawn first blood in exploration programs being carried on by a dozen different companies. Two wells at Kahta in Zone 6, bordering Syria, have encountered 10°-gravity crude. But if the field proves commercial, oil will probably have to be brought to the surface by pump.

The government operates Raman and Garzan fields located in Southeast Turkey. Output is refined and consumed in the local area.

TURKEY PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping	Daily	Cumulative	
Raman, 1945	4,400	.....	*15	3,700	6,200,000	21.1
Garzan, 1950	4,750	.....	†16	2,600	900,000	26.7
Germik, 1958	6,000	.....	1	200	1,000	20.0
Total		.....	32	6,500	7,101,000	

*10 wells shut in. †8 wells shut in.

TURKEY REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Shell, Cal-Tex, B.P., and Socony, Mersin	(1)	.....	.....	.....	.....
Turkish American Oil Co., Istanbul	(2)	.....	.....	.....	.....
Turkiye Petrolleri, A. O., Batman	[3]6,950	.....	3,060 TCC	.....	1,442 V, 1,282 A
Total	6,950	.....	3,060	.....	

(1) 65,000-bbl.-daily refinery planned. (2) Planned refinery to have 16,600-bbl. crude unit, 6,400-bbl. vacuum, 2,400-bbl. visbreaker, 4,900-bbl. FCC and 480-bbl. poly unit. (3) Additional 6,950-bbl. crude unit planned plus 5,200-bbl. unit for TCC feed preparation.

ASIA–PACIFIC

AUSTRALIA

AFTER lukewarm exploration interest for several years, Australia is getting hot again.

Main cause of excitement has been a 1,000-bbl.-daily find in Papua, Australian New Guinea. Even though the discovery at Puri was not too encouraging because of water encroachment, it is causing companies to take another look at their decision to pull out of Papua. The well was to have been the last test in a 22-year, $67,000,000 program conducted by British Petroleum, Stanvac, and a local firm, Oil Search.

Oil play in western Australia may take on new vigor with the entry of Royal Dutch-Shell. Negotiations are in an advanced stage which will give Shell equal interest in WAPET with the two largest owners, California Asiatic and Texaco Overseas. Each company will hold two-sevenths of WAPET. Ampol Exploration,

AUSTRALIA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
B.P. Refinery (Kwinana), Ltd.—Kwinana	70,000	.....	12,500 FCC	[1]6,000 Pf	24,000 V, 5,600 CH, 500 A
Australian Oil Refining, Ltd.—Kurnell	[2]33,000	.....	15,000 FCC	.....	18,000 V, 1,650 Poly
Bitumen & Oil Refineries (Australia)—Matraville	15,000	.....	.....	2,300 Pf	7,000 Un, 840 A
Commonwealth Oil Refineries, Ltd.—Laverton	[3]4,200	.....	.....	.....	.....
Shell Refining (Australia) Ptg., Ltd.:					
Clyde	10,000	.....	.....	6,700 Pf	.....
Geelong	46,000	.....	15,000 FCC	6,700 Pf	(4)
Standard-Vacuum Refining Co., Ltd.—Altona	[5]34,000	.....	15,000 TCC	5,500 Sf	1,400 V, 1,700 Alky, 670 L, 1,200 A
Total	212,200	.....	57,500	27,200	

(1) Adding 10,000-bbl. Platformer due for completion in 1959. (2) Adding 45,000-bbl. crude unit, 24,000-bbl. vacuum unit, 25,000-bbl. FCC unit, 2,500-bbl. Poly unit. (3) Shut down. (4) 11,000-bbl. hydrodesulfurizer under construction. Due completion late 1959. (5) Adding 7,000-bbl. crude capacity, 7,500-bbl. TCC unit, and Socony-type hydrogenation.

a local company, will hold the remaining seventh. The concession involved is bigger than Texas. Drilling is in progress in the Kimberleys region, where shows have been found in the last two wells.

Delhi-Taylor Oil Corp. will spud its first well next year at Innamincka on a concession it holds jointly with Santos, Ltd., a local firm. The test projected to 14,000 ft. will be on a large subsurface structure located seismically. This concession also is larger than Texas, covering parts of Queensland and South Australia.

The Australian Government is spurring exploration by sharing the cost of wildcats in some cases, and several small companies have drilling programs. Humber Oils, a Canadian firm, plans to start offshore drilling on the Great Barrier Reef.

New Zealand . . . Royal Dutch-Shell, BP, and Todd Industries, a local firm, plan a 10,000-ft. wildcat on the West Coast of New Zealand's North Island. Other programs are being carried out by BP and Todd, jointly, and by Todd alone.

BRITISH BORNEO

DRILLING in the South China Sea off British Borneo will be renewed within a few months from a new mobile drilling platform.

Brunei Shell Petroleum Co. ordered the outfit to carry on its offshore search for new reserves. This program began after poor results in a postwar onshore program. Four offshore wells drilled from fixed platforms have been dry holes. Output from Seria and Miri fields is slipping gradually. It is down to 104,600 bbl. daily from a peak of 120,000 bbl. daily last year.

BRITISH BORNEO PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping*	Production in bbl.: Daily†	Production in bbl.: Cumulative	Gravity °API
Jerudong, 1955‡	3,523-4,021	....	....	120	298,931	40-55
Miri, 1911	300-6,270	1	180	1,208	74,922,617	21.5-47.0
Seria, 1929	834-8,994	119	180	103,297	425,828,833	19-50
Total British Borneo		120	360	104,625	501,050,381	

*Includes all artificial lift wells. †Daily average first 6 months. ‡Shut in.

BRITISH BORNEO REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Sarawak Shell Oilfields, Ltd., Miri-Lutong	44,000	.....	.....	.....	.....
Total	44,000	.....	.....	.....	.....

BURMA

WILDCATTING is under way in Burma again for the first time since World War II.

The latest test of Burmah Oil Co. (1954) is also the first test in the Irrawaddy Delta. The well, at Hteingyun, is 50 miles southwest of Rangoon, and 150 miles south of the nearest production. Another well has been under way at Ondwe, south of the old Yenangyaung field.

BURMA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Chauk-Lanywa, 1902	2,500	20	211	8,800		36
Others	....	....	....	1,700	301,800,000	
Total		20	211	10,500	301,800,000	

BURMA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Burmah Oil Co. (Burmah Concessions), Ltd.:					
Chauk	4,286	.....	.....	.....	.....
Syriam	5,143	.....	.....	.....	25 C[1]
Total	9,429	.....	.....	.....	

(1) Tons daily.

FORMOSA

CHINESE PETROLEUM CORP. continues to add downstream processing facilities at its Kaoshiung refinery, and three grades of avgas will be produced when a new alkylation unit goes on stream. Exploration work continues on the island, but output has slipped to less than 40 bbl. daily from old fields.

FORMOSA (TAIWAN) PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Chinshui, 1921	6,000	8	...	4	...	
Chuhuangking, 1904	3,000	1	22	25	...	35.3
Chutonchi, 1940	4,000	5	3	7	...	40.2
Chutung, 1934*	4,600	6	...	...	...	...
Niushan, 1930*	2,300	7	3	...	...	...
Shantzechiao, 1954	1,500	...	2	3	...	18.9
Total		27	30	39	(†)	

*Gas fields. All Taiwan fields produce gas. Production averaging 3,106 M.c.f. daily. †Cumulative figures not available. Production declining from annual output of 24,500 bbl. in 1956, 17,475 bbl. in 1957 to current rate of slightly more than 16,000 bbl. a year.

FORMOSA (TAIWAN) REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Chinese Petroleum Corp., Kaoshiung	28,000	4,000 Vis	10,000 TCC	2,500 Cat	2,000 V, 700 A[1]
Total	28,000	4,000	10,000	2,500	

(1) Adding 3,000-bbl. catalytic hydrodesulfurization and 900-bbl. alkylation.

INDIA

THE INDIAN GOVERNMENT is working hard to find crude production with the help of Soviet equipment and personnel.

Two wells in Bombay State of western India have had encouraging shows. A wildcat at Vadser had a small-scale blowout, and a test at Lunej, near Cambay, encountered oil in two zones. The government says a well drilled by a Romanian crew in Punjab has brought in a major gas find.

Communists also are helping a government refinery-building program. Romanians have agreed to build a 15,000-bbl. plant at Gauhati, and Russia is offering to help in building a 40,000-bbl. plant at Barauni.

Both plants will take crude from the Nahorkatiya area in Assam, where a major discovery was made 5 years ago by Assam Oil Co., a Burmah Oil subsidiary. Nahorkatiya and nearby Moran field will be able to sustain output of 50,000 bbl. daily. The fields and pipelines to the refineries will be operated by India Oil, Ltd. Assam Oil will own two-thirds, and the government one-third.

Stanvac is carrying on a wildcatting program on a 10,000-sq.-mile block in Bengal basin. It has made no discoveries so far.

INDIA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Digboi, 1890	3,000	36	542			36
Nahorkatiya, 1953	10,000	*3	...	9,000	62,685,000	33
Moran, 1955	13,700	(†)	...			...
Total		39	542	9,000	‡62,685,000	

*29 producers shut in awaiting pipeline. †7 producers shut in awaiting pipeline. ‡Estimated.

INDIA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Assam Oil Co., Ltd., Digboi	9,000	1,500	...	...	...
Burmah-Shell Refineries, Ltd., Bombay	50,000	...	12,000	...	...
Caltex (India), Ltd., Visakhapatnam	15,000	...	8,400 FCC	6,700 Pf	7,500 V, 850 Poly
Standard-Vacuum Refining Co. of India, Bombay	36,000	...	7,700 FCC	3,800 T	250 Poly
Indian Government:					
Gauhati	(1)	...	...	...	...
Barauni	(2)	...	...	...	...
Total	110,000	1,500	28,100	10,500	

(1) 15,000-bbl. refinery planned. To be built by Romanians. (2) Russia has offered to help India build a 40,000-bbl. refinery.

INDONESIA

THE BIGGEST pipeline in the Far East has opened, delivering crude to a new terminal built by Caltex Pacific Co. at Dumai, on the east coast of Sumatra.

The 36-mile, 30-in. line carries crude from the company's shallow Duri field, where seven rigs are being used on development drilling. Eventually, a 14-in. line will tie output from Bekasap field into the 30-in. system. Minas field production, which averages about 160,000 bbl. daily, could be tied into the system later. It is now moved out by small tankers on the Siak River to an old terminal located at Pakning.

Companies rode out the Indonesian civil war this year without serious interruption. Royal Dutch-Shell was affected most, and its fields in Kalimatan (Borneo) were shut down for 2 months due to rebel harassment. Refinery operations were also temporarily suspended.

Standard-Vacuum, the smallest of the three private operators, is being pinched by a lack of new concession lands on which to explore. Its present production averages about 75,000 bbl. daily.

INDONESIA PRODUCTION

Kalimantan (Indonesian Borneo)

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping*	Production in bbl.: Daily†	Production in bbl.: Cumulative	Gravity °API
Anggana-Muara, 1902	380-3,200	3	30	1,143	69,017,550	20.5-32.3
Balik Papan (Klandasan), 1903	740-765	....	....	.....	245,860	14.5
Bunju, 1930	2,020-7,850	33	....	7,701	13,127,290	33.1
Sambodja, 1910	160-4,400	....	40	671	57,336,310	23.3-31.1
Sanga Sanga, 1897	430-2,900	3	20	1,993	156,233,220	20.6-32.3
Sangatta, 1940	1,640-4,200	....	....	.....	1,150	36.0
Tandjung, 1938‡	2,500-4,300	....	....	418	1,028,080	38.9
Tarakan, 1906	195-2,400	....	4	2,924	179,158,010	18.2
Total		39	*94	†14,850	476,147,470	

*Includes all artificial-lift wells. †Daily average first 6 months. Most fields shut in 60 days because of rebel activity. ‡Field shut in awaiting pipeline.

Java

Kawengan, 1926	1,750-2,700	3	79	5,319	70,205,600	33.2
Kruka, 1929	970-1,600	....	50	519	9,176,340	28.0
Ledok, 1896‡	320-3,200	....	....	.....	21,299,790	43.0
Lidah Kuldon, 1896‡	490-1,330	....	....	.....	33,369,000	24.5
Nglobo-Semanggi-Banjuasin, 1897	370-3,350	....	....	.....	18,604,190	43.0
Total		3	129	5,838	152,654,920	

*Includes all artificial-lift wells. †Daily average first 6 months. ‡Shut in. No activity.

Ceram

Bula Lemun, 1897*	240-920	....	....	.....	8,203,000	23.0
Total		....	....	.....	8,203,000	

*No activity. Shut in.

Total Indonesia	422	1,050	349,944	1,854,703,781	

Sumatra (South)

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping*	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Abab, 1951	6,000	6	....	448	1,418,803	35.0
Babat, 1901	100-1,050	1	13	30	8,465,800	38.8
Badjubang, 1927	2,700-3,300	4	26	1,950	34,194,300	46.0
Benakat, 1933	1,500	33	66	9,601	78,291,565	36.0
Betun, 1949	6,500	4	....	738	3,464,390	35.0
Betung, 1923	180-950	....	....	.....	2,165,770	40.5
Djirak, 1930	900	6	59	310	40,447,129	37.0
Gunung Kemala, 1938	6,200-6,340	13	2	2,720	13,666,170	38.6
Karang Ringing, 1903	160-1,200	....	....	.....	1,510,110	42.5
Kenali Asam, 1931	1,150-4,020	18	70	7,520	61,303,590	23-35
Kluang, 1914	2,300-2,600	....	....	.....	28,704,430	40.0
Krub, 1941	3,300	....	....	.....	1,474,979	38.0
Limau, 1928	4,450-5,350	55	23	31,170	43,799,500	29.9
Mangundjaja, 1935	660-2,200	....	44	1,310	16,653,800	24.2
Meruo Senami, 1938	2,400-2,650	2	1	100	312,520	46.0
Prabumlih West, 1953	4,740-5,640	6	4	1,780	5,536,760	32.9
Radja, 1940	6,500	....	....	129	11,794,457	40.0
Setiti, 1936	1,850-1,970	1	9	1,370	819,730	25.9
Suban Djerigi, 1905	1,300-2,500	1	18	690	36,791,960	47.3
Talang Akar-Pendopo, 1922	2,800	95	100	37,099	276,129,997	37.0
Talang Djimar, 1937	3,600-4,200	23	71	16,080	102,289,590	29.6
Tandjung Tiga, 1940	4,400-4,600	7	20	6,300	19,342,520	25.7
Tempino, 1931	1,930-2,700	13	94	8,830	62,774,700	46.2
Tg. Luntar, 1912	2,200-2,800	....	....	.....	4,312,090	56.0
Sei Taham, 1903†	300-1,150	....	3	190	28,716,280	43.8
Total		288	623	128,365	884,380,940	

*Includes artificial lift. †Formerly Maura Enim complex.

INDONESIA PRODUCTION (Continued)

Sumatra (Central)

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping*	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Bekasap, 1955	2,500	....	....	.....	129	35.0
Duri, 1940	600	....	102	17,624	720,656	22.5
Kotobatak, 1952	4,600	....	....	.....	4,896	32.5
Lirik, 1939	1,800	....	....	.....	123,455	34.0
Minas, 1944	2,400	66	81	161,947	170,445,989	36.0
Molek, 1956	2,700	....	....	.....	908	34.0
Pungut, 1951	2,800	1	....	40	41,878	38.5
Sago, 1940	1,800	25	21	21,280	5,834,461	34.0
Sebanga, 1940	1,000	....	....	.....	2,369	32.0
Ukui-Pulai, 1941	1,800	....	....	.....	80,710	34.0
Total		92	204	200,891	177,255,451	

North Sumata

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Djrajeu, 1929	2,520-2,590	....	....	.....	559,000	54.5
Gebang, 1936	2,970-3,400	....	....	.....	135,000	54.0
Pangkalan Susu, 1927	1,550-2,100	....	....	.....	6,287,000	56.0
Pace, 1939	2,520-2,590	....	....	.....	559,000	34.5
Pulu Pandjang, 1928	1,640-2,400	....	....	.....	11,243,000	55.5
Perlack, 1900	160-2,200	....	....	.....	47,870,000	57.0
P. Tabuhan, 1937	3,300-3,500	....	....	.....	3,283,000	52.5
Rantau, 1929	1,040-2,560	....	....	.....	55,513,000	48.5
Serang Djaja, 1926	3,560-4,150	....	....	.....	7,551,000	64.5
Telaga Said D.K.G., 1893	210-720	....	....	.....	23,621,000	51.5
Total		....	....	.....	156,062,000	

*All formerly Royal Dutch-Shell fields seized by Indonesian Government. Some fields are now being produced. No data available.

Total Sumatra	†380	†827	329,256	1,217,698,391	

†Another 405 wells shut in.

INDONESIA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
N.V. de Bataafsche Petroleum Mij.:					
Balik Papan	65,000	.....	.....	.....	.....
P. Brandan	(1)	.....	.....	.....	.....
Pladju	105,000	10,000	.....	15,000 T	.....
Tjepu	4,600	.....	.....	.....	.....
Wonokromo	3,200	.....	.....	.....	.....
N.V. Standard-Vacuum Pet. Mij., Sungei Gerong	71,000	34,000	20,000 FCC	.....	25,500 V, 750 Alky, 1,250 Poly
Total	248,800	44,000	20,000	15,000	

(1) Refinery no longer under company control.

JAPAN

THE JAPANESE are aggressively expanding their oil industry on all fronts.

Refining capacity will reach nearly 900,000 bbl. daily in 5 years as plants now being built, or planned, take shape. Most of the expansion will take place on reclaimed land at Kawasaki, between Tokyo and Yokohama. Foreign companies are playing a major part in the growth. Standard-Vacuum has 55% interest in Toa Nenryo. Caltex companies hold half interest in Nippon Petroleum and Koa Oil. Royal-Shell has half interest in Showa Oil, and Tidewater has half of Mitsubishi.

JAPAN PRODUCTION

Hokkaido

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Barato, 1957	4,879	3	....	(*)	1,704	41.0
Biratori, 1956	1,745	3	4	(*)	913	38.9
Ishikari, 1903	1,386-3,861	....	84	25	983,972	39.8
Total		6	88	25	986,589	

JAPAN PRODUCTION (Continued)

Tohoku

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Fukura, 1957	3,264	3	....	(*)	1,444	45.3
Hachimori, 1938	594-2,178	2	25	63	581,616	18.2
Higashiyama, 1893	462-2,178	....	219	151	7,545,107	28.4
Inna, 1923	660-3,531	2	275	542	7,749,359	23.3
Kitakonoura, 1957	4,585	....	2	(*)	313	25.7
Mitsuke, 1958	5,721	2	....	(*)	1,400	34.9
Niitsu, 1896	165-4,752	1	453	416	18,080,131	18.5
Nishiyama, 1888	495-6,303	2	264	265	18,698,009	37.3
Sarukawa, 1958	3,234	1	....	(*)	75	33.0
Shonai, 1944	363-957	....	33	170	1,091,399	17.6
Tamugiyama, 1956	5,215	6	....	189	30,245	43.9
Yabase, 1933	198-5,643	178	749	4,983	35,763,267	17.1-33.0
Total		197	2,000	6,779	89,542,365	
Total Japan		203	2,088	6,804	90,528,954	

*Shut in.

JAPAN REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Asia Oil Co.—Yokohama	13,000	.....	.....	1,300 Pf	600 V, 1,300 Un
Daikyo Oil Co.—Yokkaichi	25,000	.....	3,500 HD	3,000 HF	4,000 V, 1,300 L
Idemitsu Kosan:					
Tokuyama	45,000	.....	7,000 FCC	3,000 Pf	16,000 V, 3,000 Un
Kawasaki	(2)	.....	.....	.....	.....
Kita Nippon Sekiyu—Hakodate	12,000	.....	.....	.....	.....
Koa Oil Co.—Marifu	35,700	3,000	(3)	3,300 Pf	3,500 V
Maruzen Oil Co.:					
Chiba	(4)	.....	.....	.....	.....
Shimotsu	35,700	.....	3,000 FCC	.....	11,260 V, 1,750 L
Matsuyama	10,000	(5)	.....	3,000 Pf	.....
Mitsubishi Oil Co.:					
Kawasaki	61,400	3,000	.....	4,500 Pf	2,400 V, 1,030 L, 12,500 Un
Mizushima	(6)	.....	.....	.....	.....
Nihon Mining Co.—Funakawa	19,350	.....	.....	.....	1,500 V, 1,100 L
Nichimo Oil Refining Co.—Kawasaki	(7)	.....	.....	.....	.....
Nippon Seiro—Tokuyama	1,100	.....	.....	.....	.....
Nippon Oil Co.:					
Akita	4,000	1,000	.....	.....	2,139 V
Niigata	7,500	.....	.....	1,600 Pf	2,012 V
Kashiwazaki	1,500	.....	.....	.....	.....
Nippon Pet. Refg. Co.:					
Yokohama	[8]46,000	.....	5,600 FCC	.....	8,000 V, 7,980 L, 3,300 Un
Kudamatsu	26,500	.....	.....	1,500 Pf	5,800 V, 1,160 L
Muroran	10,000	.....	.....	.....	.....
Rekisei Koyu Co.—Niigata	1,000	.....	.....	.....	.....
Showa Oil Co.:					
Kawasaki	27,000	.....	.....	1,500 Pf	2,500 V, 1,500 L
Hirasawa	3,000	.....	.....	.....	1,000 V
Niigata	11,000	.....	.....	.....	1,600 V
Showa Yokkaichi Oil Co.—Yokkaichi	40,000	.....	12,000 FCC	.....	23,500 V
Toa Nenryo Kogyo Co.:					
Wakayama	57,000	3,700	10,200 FCC	4,700 Fhy	1,250 Alky, 5,000 V, 3,500 L
Shimizu	43,500	.....	.....	.....	3,800 V, 660 L
Kawasaki	(9)	.....	.....	.....	.....
Toa Oil Co.—Kawasaki	12,000	.....	.....	.....	.....
Taiyo Oil Co.—Kameoka	5,000	.....	.....	.....	2,500 V
General Sekiyu—Kawasaki	(1)	.....	.....	.....	.....
Total	553,250	10,770	41,300	27,400	

(1) 35,000-bbl. plant planned. Construction to start in 1959. (2) Construction of 50,000-bbl. plant to start in 1962, to include 15,000-bbl. cat cracker. (3) 5,000-bbl. FCC unit, 5,000-bbl. delayed coker due completion 1959. (4) Plan 60,000-bbl. refinery. Construction to start 1963. (5) 4,500-bbl. visbreaker and 1,500-bbl. Udex unit to be built 1959. (6) 40,000-bbl. refinery planned. Construction to start 1959. (7) 20,000-bbl. refinery planned. Construction to start 1960. (8) Plan new 40,000-bbl. refinery, including 10,000-bbl. cat cracker. Construction to start 1961. (9) Site purchased for new refinery. Size, construction date indefinite.

NETHERLANDS NEW GUINEA

THE OUTLOOK is gloomy for Dutch New Guinea where output from three small fields has slipped to 5,400 bbl. daily. Royal Dutch-Shell says it will pull out of the area if no important finds are made within the next few years. Its partners are Stanvac and Caltex. More than $110,000,000 has been spent in the region.

NETHERLANDS NEW GUINEA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily*	Production in bbl. Cumulative	Gravity °API
Klamono, 1936	300	.....	18	4,015	16,553,712	18.8
Mogoi, 1940	1,250	.....	13	426	4,139,809	42.8
Wasian, 1940	2,900-3,225	1	5	483	1,431,862	41.9
Total Netherlands New Guinea		1	36	*4,924	22,125,383	

*Average production first 6 months.

PAKISTAN

SEVENTEEN WELLS were drilled in Pakistan the first half of the year, and the widespread drilling is going forward without letup.

Eight companies hold licenses on 90,600 sq. miles, with Tidewater Oil Co. the latest to take out a concession. Standard-Vacuum, Royal Dutch-Shell, and Hunt International have drilling programs in progress. Sun Oil is carrying out surface work. Pakistan Petroleum, the Burmah Oil Co. subsidiary which discovered Sui gas field 5 years ago, is the most active company. Along with Sui field and its exploration program, it has a share in small local production.

Four companies have received approval for a jointly owned 30,000-bbl. refinery near Karachi.

PAKISTAN PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells Flowing	No. of wells Pumping	Production in bbl. Daily	Production in bbl. Cumulative	Gravity °API
Balkassar, 1946*	8,000	4	.....	*1,300	4,300,000	26
Dhulian, 1957	7,600-9,200	.....	.....	.....	.....	36.2-45.0
Joya Mair, 1944	7,000	.....	.....	.....	.....	19
Khaur, 1915	5,200	.....	.....	.....	.....	36
Total		.....	.....	†5,400	†27,052,581	

*Pakistan Petroleum, Ltd., only. †Includes production of Pakistan Oilfields, Ltd., subsidiary of Attock Oil Co., which will not reveal field data.

PAKISTAN REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking Thermal	Cracking Catalytic	Reforming	Other processing
Attock Oil Co., Ltd., Rawalpindi	6,000	.....	.....	.....	.....
Total	6,000	.....	.....	.....	

PHILIPPINES REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking Thermal	Cracking Catalytic	Reforming	Other processing
Caltex (Philippines), Inc.	18,000	.....	7,500 FCC	.....	9,000 V, 950 Poly
Gulf-Philippine Investment, Luzon	(3)	.....	.....	.....	.....
Royal Dutch-Shell	(2)	.....	.....	.....	.....
Standard-Vacuum Oil Co., Bataan	(1)	.....	.....	.....	.....
Total	18,000	.....	7,500	.....	

(1) New 25,000-bbl. skimming plant under development. (2) Government has approved plans for 20,000-bbl. refinery. (3) Plan 10,000-bbl. refinery with 1961 completion date subject to government approval.

AFRICA

ALGERIA

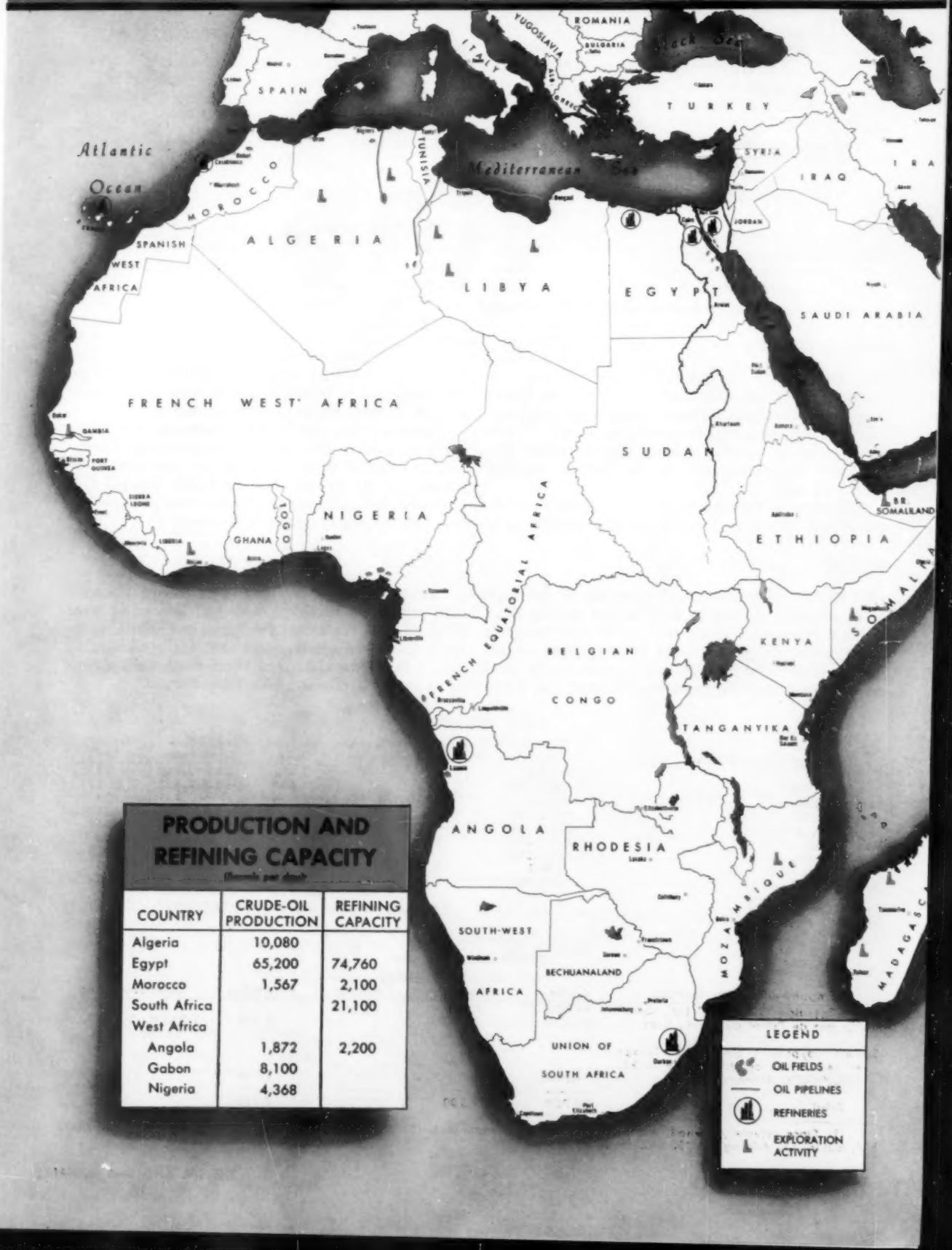
WORK is starting on two pipelines that will make Algeria a major oil country within 3 years.

The project getting the earliest start is a 412-mile, 24-in. crude line from Hassi Messaoud field in the Sahara to Bougie. The system will deliver 240,000 bbl. daily to the Mediterranean. The French companies developing the field, S.N. Repal, and C.F.P. (A), have 11 rigs running on the structure. Sixteen of the first seventeen wells drilled have been producers. Present shipments to the Coast via rail and 6-in. pipeline are more than 11,000 bbl. daily.

Spreads on the second pipeline are expected to start moving next year. This will be a 470-mile, 24-in. line from CREPS fields in the Sahara near the Libyan frontier. It will terminate at El Shkirra, Tunisia. CREPS, owned 35% by Royal Dutch-Shell, hopes to be moving 150,000 bbl. daily of high-gravity crude through the system by October 1960. Output will be boosted later to 275,000 bbl. daily. The most prolific CREPS field is turning out to be Zarzaitine, found last year. Other fields under development are Edjele and Tiguentourine. Finds have been made this year at Eladeb Lacache and Ouan Taredert.

A new oil law for Algeria has been enacted in an effort to attract more major foreign companies, many of which shied away from competitive bidding for acreage last year. Sinclair, Phillips, Newmont Mining, and Cities Service have concessions in partnership with French interests, but their participation is small in the over-all picture. Shell is the exception.

AFRICA



PRODUCTION AND REFINING CAPACITY

(Barrels per day)

COUNTRY	CRUDE-OIL PRODUCTION	REFINING CAPACITY
Algeria	10,080	
Egypt	65,200	74,760
Morocco	1,567	2,100
South Africa		21,100
West Africa		
Angola	1,872	2,200
Gabon	8,100	
Nigeria	4,368	

LEGEND

- OIL FIELDS
- OIL PIPELINES
- REFINERIES
- EXPLORATION ACTIVITY

ALGERIA (AND SAHARA) PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Oued Gueterini, 1949	1,100-1,600	....	15	80	2,448,000	39
Edjele, 1956	1,600-2,700	(*)	....	....	....	35
Hassi Messaoud, 1956	11,000	7	....	10,000	1,180,000	44
Hassi R'Mel, 1956	6,900-7,400	(†)	....	....	....	....
Tiguentourine, 1956	2,800	(‡)	....	....	....	....
Zarzaitine, 1957	4,500	(§)	....	....	....	42
Eladeb Larache, 1958	2,700	(¶)	....	....	....	....
Total		7	15	10,080	3,628,000	

*36 wells shut in awaiting pipelines. †4-well gas condensate field shut in. ‡7-well field shut in awaiting pipeline. §3 wells shut in. ¶1-well field discovery.

ALGERIA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Jersey Standard-CFP-Royal Dutch-Shell, etc., Algiers	(1)	.....	.....	.....	.....
Total					

(1) Seven-company combine plans 40,000-bbl. refinery.

EAST AFRICA

ONE DRILLING PROGRAM in British Somaliland has been called off, and another started. The Conorada group (Continental, Ohio, Amerada) gave up after five dry holes on a 36,000-sq.-mile concession. Standard-Vacuum, in contrast, has just started its first test, at Dagah Shabell, on one of two licenses covering 11,000 sq. miles.

Elsewhere in East Africa, Indiana Standard has acquired half interest in a 46,000-sq.-mile concession in Mozambique held by Gulf Oil. BP-Shell Petroleum Development Co. is continuing its deep drilling program in Tanganyika, so far without success.

Frobisher, Ltd., a Canadian company, has taken out a concession over parts of Somalia and Kenya. Stanvac acquired Somalia acreage last year, but so far has not started drilling. Sinclair Somal (Sinclair Oil, Conorada) and an Italian Government company, AGIP, both have drilling programs in progress.

EGYPT

EGYPTIAN production is rising steadily as the result of development drilling in Belayim and Rudeis fields in Sinai Peninsula. These are held by Cie. Orientale des Petroles d'Egypte, owned 49% by the government, and 51% by International Egyptian. Chief owners of International Egyptian are Petrofina and E.N.I.

Socony Mobil is the only other foreign company with production in Egypt, with half interest in three fields on Sinai Peninsula. Producing and refining properties held by Anglo-Egyptian Oilfields, controlled by British Petroleum and Royal Dutch-Shell, were sequestered when Egypt was invaded 2 years ago.

EGYPT PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells—Flowing	No. of wells—Pumping	Production in bbl.—Daily	Production in bbl.—Cumulative	Gravity °API
Asl, 1948	2,870-3,870	6	2	3,100	26,993,263	22
Belayim, 1955	5,100-8,700	30	....	29,400	10,838,543	22-23
Feiran, 1949	6,800	3	....	300	603,261	26
Gemsa, 1908	400-2,000	....	....	....	1,445,381	41
Hurghada, 1913	700-2,500	....	23	600	39,378,577	22-30
Ras Gharib, 1938	1,200-2,500	8	117	19,500	155,964,209	26
Ras Matarma, 1948	1,940-3,200	....	2	200	448,114	17-18
Abu Rudeis, 1956	8,500	3	....	9,100	2,064,914	22
Sudr, 1946	2,700-3,000	2	10	3,000	30,431,744	23-24
Total		52	154	65,200	268,168,006	

EGYPT REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking—Thermal	Cracking—Catalytic	Reforming	Other processing
Anglo-Egyptian Oil Fields, Ltd., Suez[1]	44,000	6,500	.....	.....	.....
Raffinerie de Petrol du Govt., Suez	[2]26,000	2,700	.....	2,700 T	1,300 V, 500 Poly, 650 A
Societe Egyptienne pour la Raffinage et le Commerce du Petrole S.G.E. ("SERCOP"), Alexandria	[3]4,760	.....	.....	1,050 CR	.....
Total	74,760	9,200	.....	3,750	

(1) Once privately owned, plant sequestered by government. (2) Proposed expansion to make crude capacity 30,000 bbl. daily. (3) Adding 20,000-bbl. crude capacity.

LIBYA

LIBYA'S first commercial discovery may be in the making on a structure comparatively close to the Mediterranean.

Oasis Oil Co. (Ohio), operator on concessions held by the Conorada group (Ohio, Continental, Amerada), has brought in two wells on Block 32, 75 miles south of the Gulf of Sirte. Bahi 1 yielded 75 bbl. on a 2½-hour test. Twenty-four miles south, Dahra B-1 yielded 38 bbl. on a 75-minute test. A third well has been started.

Two of the other 10 operators also have found oil. But Esso Standard's find at Atshan in Fezzan has turned out noncommercial, and the rig has been moved to the northern part of the block. A French company, Cie. des Petroles Total, brought in an 8-bbl. per hour well near the Algerian border.

MOROCCO AND TUNISIA

MOROCCO this year awarded two concessions within weeks of passing a new oil law.

The first award went to the Italian state company, E.N.I., which made another of its 75-25 profit split agreements for rights over 11,580 sq. miles in southern Morocco. The acreage lies in an area turned over to the young government by Spain in spring. A concession of equal size also has been awarded to Ambassador Oil Corp. in the same general area. Algeria may possibly dispute part of the lands awarded to both companies because the border has never been established in the area.

Tunisia has awarded concessions to two American companies. Conorada agreed to spend $4,000,000 in the next 5 years in return for a license on 11,000 sq. miles in the west-central part of the country. Rimrock International Corp. acquired rights over 6,000 sq. miles, most of it in Central Tunisia. A French company, SEREPT, holds the most extensive right and operates a 10-year-old gas field at Cap Bon.

MOROCCO PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells		Production in bbl.		Gravity °API
		Flowing	Pumping	Daily	Cumulative	
Ain Hamra, 1918	400	....	....	.....	93,772	36.5
Bou-Draa, 1936	2,800	2	3	47	273,651	39.2
Bled ed Defaa, 1952	....	....	....	.....	63,825	....
Mers-el-Kharez, 1951	4,300	6	....	55	572,178	36.7
Oued Mellah, 1949	1,900	12	....	72	414,752	28.5
Upper Bled ed Doum, 1952	3,950	....	9	186	652,213	39.0
Lower Bled ed Doum, 1952	4,300	7	....	235	765,503	37.0
Upper Bled Khatara, 1953	4,600	....	10	232	632,766	39.5
Lower Bled Khatara, 1954	5,200	3	1	38	142,262	40.0
Upper Sidi Fili, 1952	3,950	....	4	83	256,413	39.0
Lower Sidi Fili, 1950	4,500	12	....	90	1,033,974	36.7
Tisserand, 1948*	....	....	....	.....	10,120	....
Lower Zrar, 1955	5,600	1	....	44	102,248	35.7
Upper Zrar, 1955	4,900	....	1	13	11,549	36.0
Oued Beth, 1947	3,300	11	....	62	945,407	35.0
Haricha, 1957	2,700	6	....	410	114,546	40.5
Total Morocco		60	28	1,567	6,085,179	

*Depleted.

MOROCCO REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Ste. Cherifienne des Petroles, Petitjean	2,100	.....	1,800 TCC	.....	.....
Total	2,100	.....	1,800	.....	.....

SOUTH AFRICA

THERE is no refinery construction under way in South Africa, except for a 4,900-bbl. crude expansion at Stanvac's Durban plant, the only one in the country. Royal Dutch-Shell has received approval in principle from the government for a $70,000,000 refining project it has proposed.

SOUTH AFRICA REFINING
(Barrels per stream day)

Company—Refinery location—	Crude	Cracking		Reforming	Other processing
		Thermal	Catalytic		
Standard-Vacuum Refining Co. of South Africa, Ltd.—Durban	[1]21,100	.....	10,000 FCC	2,000	3,200 V, 250 Poly, 1,000 A
Total	21,100	.....	10,000	2,000	.....

(1) Adding 4,900-bbl. crude capacity plus. Powerformer and Hydrofining.

WEST AFRICA

CRUDE is now being produced commercially in three regions of West Africa.

The bulk of the oil is coming from Gabon, French Equatorial Africa, where SPAEF is producing more than 10,000 bbl. daily from fields in the Port Gentil area on the Atlantic Coast. SPAEF also has a discovery at Pointe Indienne in Middle Congo. The company has reserved the territory around Port Gentil and Pointe Indienne for itself. But it has signed agreements for joint exploration and development on two blocks with Socony Mobil, and on one block with Royal Dutch-Shell.

In Nigeria, five discoveries have given the country its best exploration year in more than two decades of oil play. One of the finds, 1 Krakrama, was drilled from a new barge in the Niger River Delta. Shell-B.P. Petroleum Development Co. is producing commercially on a test basis in two other young fields, taking off the oil through pipelines to Port Harcourt.

Angola output is being held to less than 2,000 bbl. daily by the limits of the local market. Output is processed at a topping plant opened this year by a Petrofina affiliate.

Gulf Oil has started wildcatting in the coastal enclave of Cabinda, north of Belgium Congo. Elsewhere in West Africa, a French company is exploring in the Cameroons, and British Petroleum is partner in a well under way in Senegal. Plymouth Oil Co. and Benedum-Trees Oil Co. have started a 13,000-ft. wildcat on a new concession in Ivory Coast.

WEST AFRICA PRODUCTION

Name of field—Discovery date—	Depth (ft.)	No. of wells: Flowing	No. of wells: Pumping	Production in bbl.: Daily	Production in bbl.: Cumulative	Gravity °API
Angola						
Benfica, 1955	8,530	5	....	1,139	66,768	28.0
Lower Cacuaco, 1958	8,200	1	....	200	320	25.9
Upper Cacuaco, 1958	1,150	....	1	3	610	25.9
Lower Luanda, 1957	5,580	4	....	518	78,832	29.6
Upper Luanda, 1957	2,130	1	2	12	1,430	29.6
Total Angola		11	3	1,872	147,960	
Gabon						
Alewana, 1958	2,900	(*)	....	.....	.....	....
Animba, 1957	1,600	†4	....	.....	.....	....
Cap Lopez, 1958	5,:00	(*)	....	.....	.....	....
Ozouri, 1956	2,000	9	....	2,000	1,010,000	22
Pointe Clairette, 1956	3,000-4,000	36	....	3,500	1,155,000	33
M'Bega, 1957	2,600	14	....	2,600	367,300	28
Total Gabon		63	....	8,100	2,532,300	
Moyen Congo						
Pointe Indienne, 1957	4,400	*3	....	.....	.....	....
Nigeria						
Afam, 1957	9,000-9,400	3	....	1,900	343,918	36.5-44.5
Akata, 1953	5,500-7,000	....	....	.....	.....	48.0
Bomu, 1958	7,100-7,500	1	....	270	48,910	31.3
Oloibiri, 1956	8,000-9,500	5	....	2,171	401,904	20.0-26.0
Soku, 1958	10,600-10,650	1	....	27	4,860	33.8
Total		10	....	4,368	799,592	

*Shut-in field discoveries. †Shut in.

*Shut in.

*Daily average first 6 months.

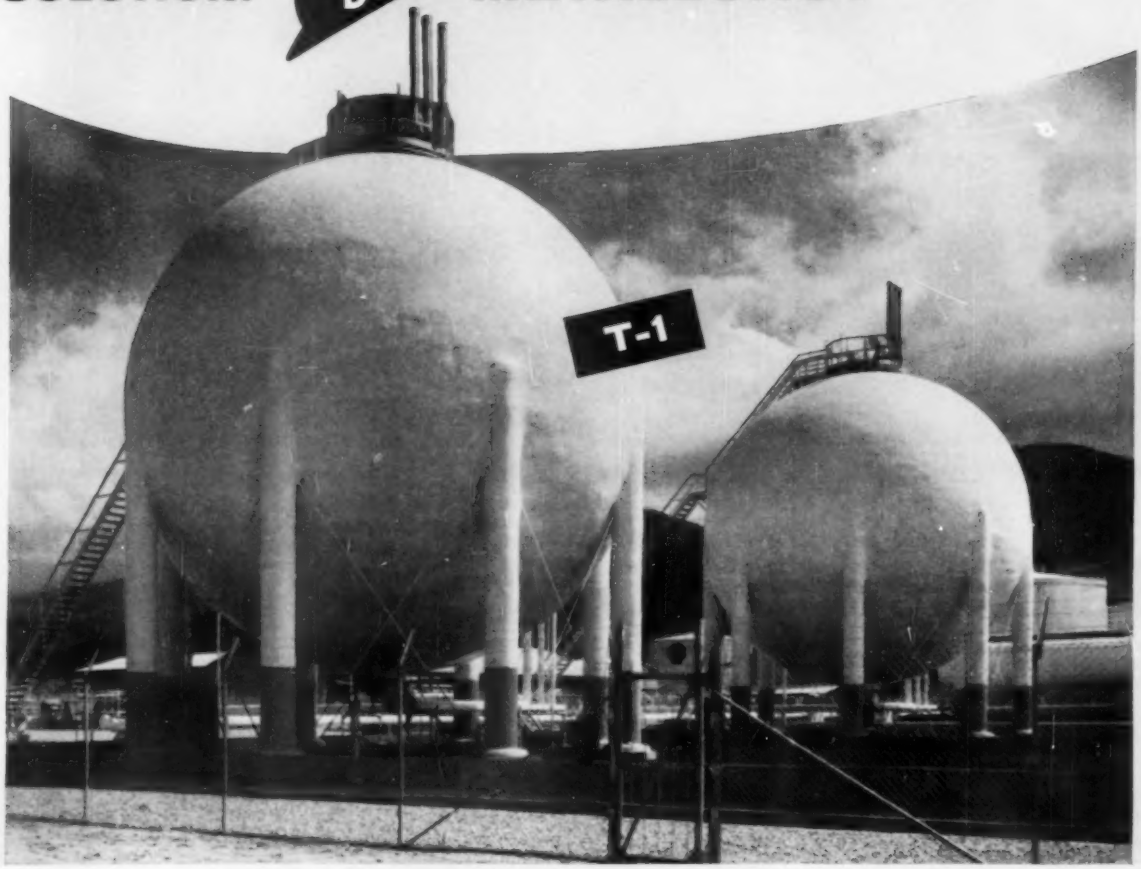
WEST AFRICA REFINING

(Barrels per stream day)

Company—Refinery location—	Crude	Cracking: Thermal	Cracking: Catalytic	Reforming	Other processing
Companhia de Petroleos de Angola, Luanda, Angola	2,200	.....	.....	.....	.....
Total	2,200	.....	.....	.....	.....

PROBLEM: More Propane for Caracas

SOLUTION: CB&I METALLURGY



Why 2 HORTONSPHERES® do the work of 20 Tanks

Increased usage of propane in Caracas made it necessary for Compania Shell de Venezuela Ltd. to either (1) add to the company's already crowded bulk storage facilities at *Catia La Mar* or (2) place another tanker in service.

Thanks to CB&I *craftsmanship in steel*, Shell was able to solve its problem without additional shipping expense; and without adding more real estate.

Two 6,900-barrel capacity Hortonspheres, designed by CB&I for 235 lbs. working pressure, were fabricated at our Greenville plant of T-1 steel. The strong alloy made it possible for the two high pressure vessels to store as much propane as 20 smaller, mild steel vessels.

CB&I's practiced knowledge and extensive facilities for designing, fabricating and erecting structures of modern metals made these savings possible. The most complete metallurgical testing facilities, which include X-ray and stress relieving services in shop and field, have made the experienced capabilities of CB&I *in demand* . . . all over the world.

Write our nearest office for details. Ask for the CB&I Bulletin *Special Plate Structures.*

SPECIFICATIONS

2 HORTONSPHERES—
Propane Storage

Compania Shell de Venezuela Ltd.

Capacity: 6,900-bbl. each

Pressure: 235 lbs. per sq. inch

Steel: T-1

Diam: 42-ft.

METALLURGICAL CONTROLS

Joint Efficiency—95%

Stress relieved in field

X-rayed 100% in field

Hydrostatic test: 354 lbs. sq. in. (at top of vessel)

Design: In accordance with ASME Code Case #1204-3

Designed, engineered, fabricated by CB&I and erected by our subsidiary CB&I, Ltd.

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P74CB

THE ESSO LEXINGTON, 37,000 d.w. tons, one of four sister ships owned by Esso Standard Oil Co. These vessels are the largest and fastest tankers operating today under United States flag registry.

Tanker surplus will get bigger

Shipyards are delivering new ones at record rates, as result of backlog of orders during past 2 years

BY LOREN F. KAHLE
Transportation Coordinator,
Standard Oil Co. (N. J.)

THE ocean-transportation phase of the petroleum business is still suffering from a bad case of oversupply and, as a result, the spot-market freight rates have stayed at low levels for a longer period than at any time since the end of World War II. Furthermore, it could be some time before there is a change from the present surplus position.

One of the most significant points influencing the current outlook is the huge backlog of new construction orders which still overshadows the future tanker supply-demand balance. Recently, statements to the effect that "the tanker-building boom is tapering off" have appeared more frequently in the public press and various trade papers. These statements are somewhat misleading, in our opinion, since tanker-building activity on a world-wide basis is continuing at record-high delivery rates, as a result of the large backlog of orders existing during the past 2 years.

Construction Backlog and Market

The chart shows a relationship between the backlog of new construction, consisting of vessels on order or under construction, and the state of

The author on the hazards of forecasting—and some definitions

A while ago a friend showed me a cartoon which contained a message appropriate to any article on the world-wide industry tanker situation. In the sketch, two professors were chatting amidst the ivy-covered halls, and one was saying . . . "forecasting is very difficult—**especially** for the future!" With these words clearly in mind, we have embarked on the preparation of this article, the sixth in a series appearing in the Journal since 1952.

All statistics regarding ocean-going tankers herein are for vessels 6,000 d.w tons and above. The term "T-2 equivalent" used herein provides an approximate common denominator for relating the carrying capacity of any tanker, recognizing its size and speed, to that of the 16,600 d.w. tons, 14.6-knot T-2 type tanker built in U. S. shipyards during World War II. For example, a 26,000-ton, 17.0-knot tanker is 26,000 × 17.0 ÷ 16,600 × 14.6 or 1.8 T-2 equivalent. We recognize that for certain special studies, this T-2 equivalent calculation must be further refined, but the "deadweight × speed" approach is entirely satisfactory for outlook studies of this sort.

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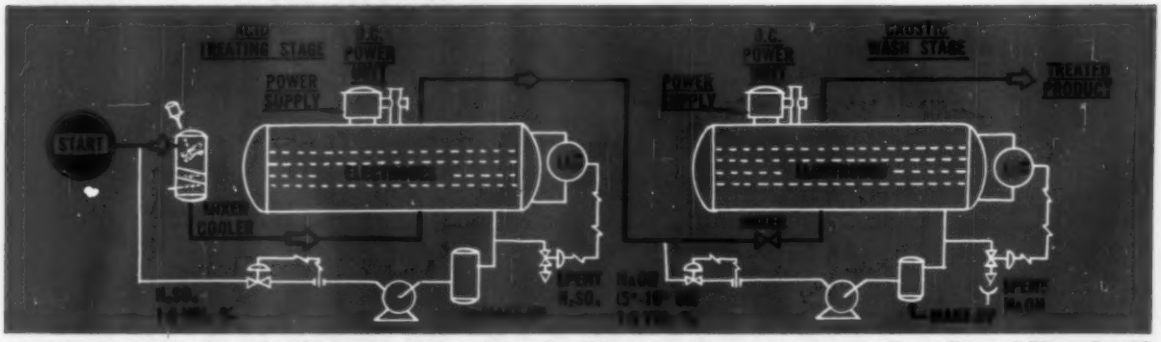
for improved refinery yields at lower refining costs

NEW PROCESS: ELECTROSTATIC DESULFURIZATION



APPLICATION: Reduction of sulfur concentrations in naphtha feed stocks from 0.02 - 1.2 weight percent to 0.002 - 0.005 in the treated products. Successfully applied to sulfur reduction in middle distillates such as kerosene and diesel.

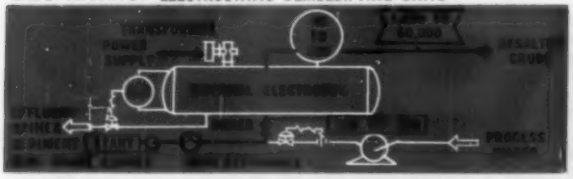
PROCESS: Mechanical (propellor) mixing of acid and oil reduces particle size of the acid to colloidal dimensions for maximized surface area. Entering the electrical field in first treating stage, these particles are violently excited, maximizing random contact with sulfur molecules (electrostatic mixing). Sufficient electrical potential is imposed in the upper portion of the field to enhance random contact of any two acid (or caustic) particles, coalescing them. Reaction is sustained until particles accumulate sufficient mass to fall to the vessel bottom by gravity. Acid carry-over is neutralized in the second treating stage with weak caustic; carry-over of sodium from second stage is warranted not to exceed one ppm. A water wash is frequently employed to assure a perfectly clean product.

PRODUCTION CREDITS: *Carry-Over of Treating Agent* eliminated by electrical coagulation. *Undesirable Side Reactions* (esterification and sulfonation) prevented by ambient reaction temperatures. *Poor Pumpability* of acid due to formation of gummy polymers is prevented by positive pressure (oxygen-free).

ECONOMIC CREDITS: *Total Installed Cost* is about ¼ the cost of hydrodesulfurization units, with substantial reductions when existing vessels can be employed. *Operating Costs* average less than 5 cents per barrel, or about ¼ the cost of hydrodesulfurization, with further reductions if alkylation acid is available. Normal electrical operating load is only 2KVA. *Mechanical Failures* are nil, due to low operating temperatures and pressures, absence of moving parts, "over-designed" electrical components (in terms of normal versus maximum load). *Labor Time* is restricted to one hour per shift for sampling, instrument readings, etc. One annual inspection is adequate. *Yield Losses* are less than 0.5% when treating virgin naphthas.

COMMERCIAL INSTALLATIONS: Unusually rapid acceptance of the new process is exhibited by startups of three plants scheduled for Fall of 1958. References on request; pilot unit available for clients at no charge in Howe-Baker's Tyler laboratories.

DESALTING: ELECTROSTATIC DEMULSIFYING UNITS



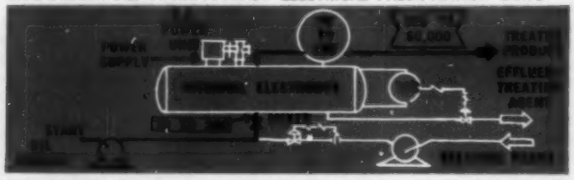
DESCRIPTION: Process to remove salt and other impurities from crude being charged to distillation equipment.

EQUIPMENT: Electrical equipment in desalting vessel; power supply, instrumentation, etc.

ECONOMIC CREDITS: Economic studies show payouts will vary from low of 50% a year to a high of 250% a year. Minimum credits accruing to refiner from its use: 4.6c/bbl., through increased capacity; 1.1c/bbl., through reduced maintenance; 1.6c/bbl., through improved catalytic and thermal cracking operations; 0.6c/bbl., through reduced corrosion damage; 0.2c/bbl., through increased tank capacity. Total credits: 8.1c per barrel of crude charged.

PROVED: Units now in use have a combined designed capacity of 2.5 million bpsd.

DISTILLATE TREATING: ELECTRICAL PRECIPITATION UNITS



DESCRIPTION: Process to remove treating agent (such as acid, caustic or water) from petroleum distillates.

EQUIPMENT: Electrical equipment in conventional treating vessel; power supply, instrumentation, etc. Frequently, electrical equipment can be installed in existing vessel.

EFFICIENT: Fully automatic and continuous, electrical precipitation drastically reduces carry-over of addition agent . . . lowers chemical consumption . . . eliminates many disadvantages of batch settling.

PROVED: Acceptance by refiners all over the world has been very rapid — over 1 million BPD capacity of commercial units sold — an additional 2.5 million BPD under consideration. Send for Howe-Baker's new distillate treating report.

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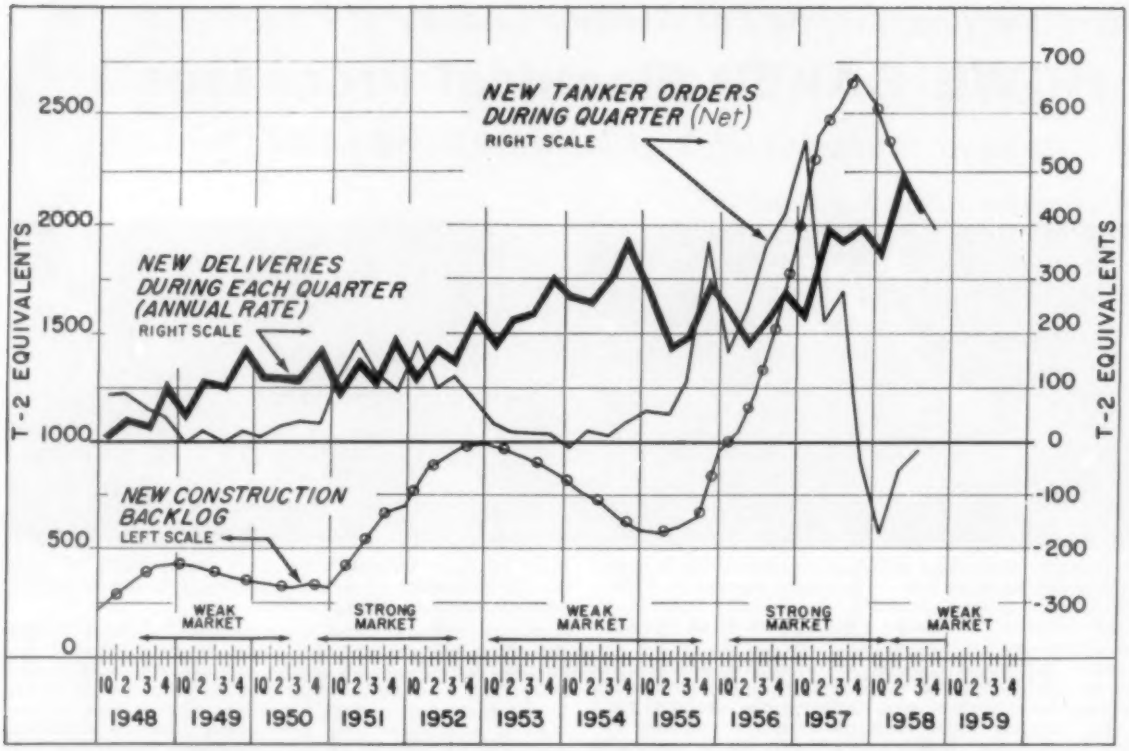


HIGH NEW CONSTRUCTION backlog, forerunner of a prolonged weak market.

the tanker market from 1948 through third quarter 1958. Historically, a high backlog of tanker orders has been the forerunner of a prolonged weak market, and the present situation is a case in point. The line of the graph linking a series of circles plots tankers on order or under construction as of the first of each quarter from 1948 through October 1, 1958; the scale on the left-hand side is T-2 equivalents. *(Continued on page 141)*

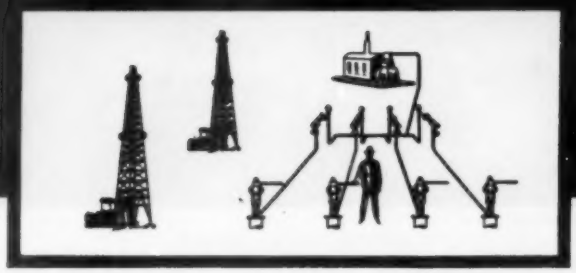
TABLE 1—TANKERS REPORTED UNDER CONSTRUCTION OR ON ORDER OCTOBER 1, 1958

Yards—	No.	D.w. tons	T-2 equiv.	Contract delivery dates T-2 equivalent 1958	1959	1960	1961	1962	1963	1964	1965	Unknown
United States	58	2,468,150	173.0	23.0	83.8	47.4	18.8	...	...	...	...	...
British	159	5,102,040	336.8	20.4	86.2	64.4	66.7	33.4	45.5	17.7	2.5	...
Canadian	2	80,000	5.2	...	2.6	2.6	...	...	...	...	...	...
Swedish	126	4,242,560	280.1	11.9	60.4	67.6	57.0	38.7	28.7	2.6	...	13.2
Norwegian	62	1,750,500	115.6	1.3	16.7	13.1	30.0	19.2	15.6	10.0	9.7	...
Danish	32	1,003,400	66.2	4.4	16.4	13.6	5.7	13.9	5.8	3.2	3.2	...
French	43	1,857,778	122.6	13.1	24.2	34.1	26.4	24.8	...	...	...	...
Spanish	35	712,800	47.1	3.6	6.3	8.2	3.1	1.2	...	...	...	24.7
Netherlands	65	1,957,530	129.2	6.7	32.7	36.3	34.3	13.0	6.2	...	...	...
Italian	47	1,590,555	105.0	7.1	45.0	23.2	19.5	10.2	...	...	...	...
Belgium	16	477,430	31.7	3.4	8.6	7.6	4.7	6.1	1.3	...	...	...
Japanese	103	4,692,575	309.8	47.6	111.8	90.9	39.2	14.3	4.3	...	...	1.7
German	92	3,530,720	233.1	11.0	54.1	43.9	67.8	23.4	15.5	9.2	...	8.2
Portuguese	1	27,000	1.8	...	...	...	1.8	...	...	...	...	...
Yugoslavia	3	63,900	4.2	...	...	4.2	...	...	...	...	...	...
Greek	2	49,000	3.2	...	...	1.6	1.6	...	...	...	...	...
Formosa	2	72,000	4.8	...	2.4	2.4	...	...	...	...	...	...
Australia	1	32,250	2.1	...	...	2.1	...	...	...	...	...	...
Total	849	29,710,188	1,971.5	153.5	551.2	463.2	376.6	198.2	122.9	42.7	15.4	47.8
Yards or owners unknown	11	393,600	26.1									
Total	860	30,103,788	1,997.6									

TANKERS DELIVERED

Yards—	Jan.-Sept. 1958 No.	D.w. tons	T-2 equiv.	1957 No.	D.w. tons	T-2 equiv.	1956 No.	D.w. tons	T-2 equiv.
United States	11	396,308	27.7	11	373,200	26.8	5	144,072	9.8
Foreign	161	4,455,836	288.9	167	4,755,667	312.7	126	3,326,648	214.0
Total	172	4,852,144	316.6	178	5,128,867	339.5	131	3,470,720	223.8
Deliveries reported Sept. 1, 1958	147	4,061,325	264.7	...	...	...	...	...	...
Deliveries reported Oct. 1, 1957-1956	...	...	...	124	3,712,198	242.7	95	2,437,640	157.1

WATCH SARGENT PUMP PERFORMANCE



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In 1924 the first Sargent hydraulic pump patent was obtained (patent #1,503,602).

Through years of research, re-design and refinement, Sargent now manufactures the pump proven to be the most efficient rodless, long stroking, bottom hole hydraulic unit obtainable, which actuates the time-proven bottom hole pump. Sargent provides the most complete service in the industry by company trained experts through company operated field stores.

The outstanding features of the Sargent rodless, long stroking, free or conventional design hydraulic pumps are: • More volume • Wide selection of proven metals and design • Higher efficiency in gassy wells • Simple, yet rugged construction • Service in the fields (at the point of operation).

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"GOOD WILL" is the disposition of the pleased customer to return to the place where he has been well treated.
—U. S. Supreme Court

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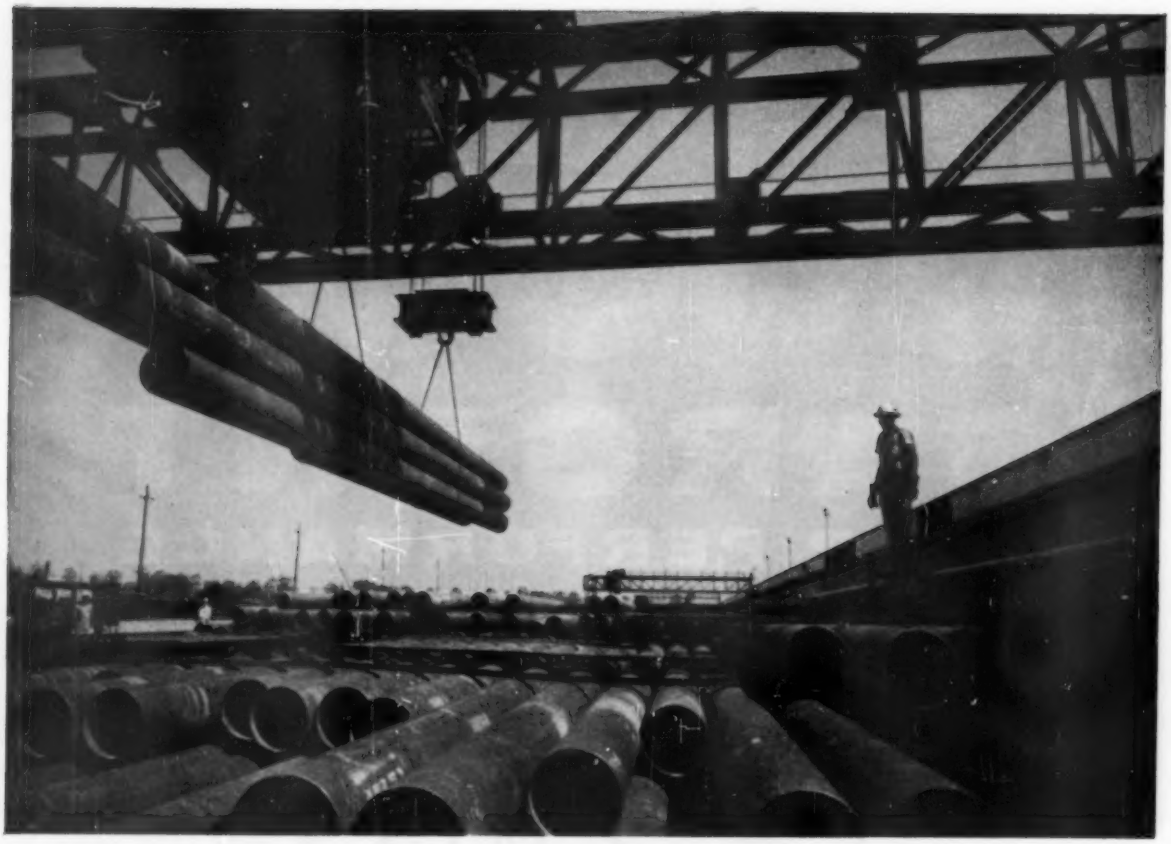

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The light line represents the net new tanker orders placed during each quarter expressed in T-2 equivalents on the right-hand scale. Net new orders are (a) reported new orders **less** (b) cancellations, contracts that "failed to materialize," etc. For example, industry placed net new orders equivalent to about 550 T-2's in the first quarter of 1957 partly as a result of the Suez crisis.

The dark line shows the pace of new tanker deliveries. The annual rate is shown on the right-hand scale; actual quarterly deliveries were multiplied by four so as to reflect an annual output of new vessels.

Industry ordering of new tankers fell off as 1948 progressed and resulted in a peak backlog of about 400 T-2 equivalents at the beginning of 1949, which fell off with the weak market of 1949 and early 1950. Note, however, that the tempo of tanker deliveries continued upward through 1949 and into 1950—or 2 years after the peak backlog was reached.

A favorable outlook for the industry during the strong charter market of the Korean War period resulted in renewed ordering; the backlog again climbed and by January 1, 1953, about 1,000 T-2 equivalents were on order. This then represented new construction equal to about 65% of the operating fleet. This huge backlog fell away during 1953, 1954, and early 1955 as the weak market held new orders down to insignificant levels. Meanwhile, however, the inertia of the huge backlog again carried tanker deliveries to all-time highs. Thus, in the midst of a very weak charter market, 1954 provided a record high delivery of about 300 T-2 equivalents. Again, the cycle repeated and after reaching its ebb in early 1955, further new orders and reduced deliveries shot the backlog up to 1,000 T-2 equivalents by year end 1955. Thus, the backlog was already very high in mid-1956, when the Suez crisis compounded the situation by increasing the figure to nearly 2,700 T-2 equivalents by the beginning of the third quarter of 1957.

In 1958 the backlog has retreated as a result of record-high deliveries coupled with contract cancellations, conversions of tankers to dry cargo vessels, etc. Even today, however, the backlog stands at nearly 2,000 T-2 equivalents or approximately 74% of the world's operating fleet.

As in the prior cycles just cited, the evidence today clearly points to a continued period of record-high tanker deliveries for the rest of 1958 and into 1959.

Table 1 lists tankers reported on order or under construction by shipbuilding countries as of October 1, 1958. Of special note is the high level of activity in Japanese yards for this year and next—although the backlog in Japan appears to be fairly low by 1960. The tempo of deliveries in U. S. yards is on the increase with a peak expected next year.

The Long-Range Outlook

The long-range industry tonnage positions summarized in Table 2 points to the conclusion that potential tanker availability **could** exceed estimated future requirements by large and ever-increasing amounts. The accuracy of these estimates of potential tanker availability is subject to two principal economic factors.

The first factor is the extent of reduction in planned new construction. The light solid line on the chart shows that this factor has already come into play in the industry because, in the past year "net new orders" have been a negative quantity in each quarter; i.e. cancellations have exceeded new orders.

The second factor is economic obsolescence of the older, smaller tankers which probably cannot operate profitably in competition with the larger more efficient low-cost carriers. As of October 1, about 245 T-2 equivalents of ocean-going tankers were tied up. By size nearly 90% of these idle tankers are 20,000 d.w. tons or smaller (including many T-2-type ves-

TABLE 2—ESTIMATED POTENTIAL INDUSTRY TONNAGE POSITIONS

	Year-end T-2 equivalents			
	1958	1959	1960	1961
Today's fleet less normal obsolescence	2,575	2,525	2,475	2,410
New deliveries (accumulative)	435	795	1,115	1,415
Potential fleet availability	3,010	3,320	3,590	3,825
Tonnage requirements	2,570	2,700	2,935	3,060
Theoretical surplus*	440	620	655	765
Per cent surplus	14.6	18.7	18.2	20.0

	Potential deliveries assumed during calendar year			
	1958	1959	1960	1961
United States yards	45	80	45	25
Foreign yards	390	280	275	275
Total	435	360	320	300

*Includes tieups and surplus in the form of slowdown, etc.

TABLE 3—WORLD TANKER TONNAGE AS OF OCTOBER 1, 1958

	Total World*		
	No.	D.w. tons	T-2 equiv.
6,000-16,000	820	10,242,543	517.3
16,001-20,000	1,151	20,028,619	1,202.7
20,001-30,000	380	9,393,407	592.7
30,001-40,000	245	8,253,861	555.7
40,001-50,000	43	1,883,113	128.1
50,001-60,000	5	268,635	18.2
Over 60,000	7	598,945	35.7
Total	2,651	50,669,123	3,050.4
Average vessel	.....	19,200	1.15

*World tanker tonnage 6,000 d.w. tons and over, excluding military and USSR.

TABLE 4—WORLD TANKER CONSTRUCTION AS OF OCTOBER 1, 1958

	U. S. yards			Foreign yards			Total		
	No.	D.w. tons	T-2 equiv.	No.	D.w. tons	T-2 equiv.	No.	D.w. tons	T-2 equiv.
6,000-16,000	.....	.....	.....	30	384,800	25.4	30	384,800	25.4
16,001-20,000	1	16,200	1.1	178	3,377,730	223.0	179	3,393,930	224.1
20,001-30,000	10	286,000	20.3	86	2,142,325	141.4	96	2,428,325	161.7
30,001-40,000	14	461,200	32.2	261	9,194,063	607.0	275	9,655,263	639.2
40,001-50,000	26	1,193,250	82.9	179	8,274,704	546.3	205	9,467,954	629.2
50,001-60,000	4	240,000	17.0	3	152,900	10.1	7	392,900	27.1
Over 60,000	3	271,500	19.5	54	3,715,516	245.3	57	3,987,016	264.8
Total	58	2,468,150	173.0	791	27,242,038	1,798.5	849	29,710,188	1,971.5

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*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

sels). By age, 74% are vessels more than 10 years old. In spite of this large group of inactive tankers, only about 25 T-2 equivalents of ocean tonnage have been scrapped, converted to dry cargo, etc. so far this year. Even so, in order to return to operation, these smaller, older, and hence relatively high-operating-cost vessels will have to compete with new large supertankers which can provide the low-cost crude and product transportation desired by the petroleum industry. Therefore, it is questionable whether many of these currently in-

TABLE 5—WORLD'S TANKER TONNAGE—CLASSIFIED BY FLAG (300 GROSS TONS AND OVER) AS OF OCTOBER 1, 1958

Country—	World ranking	Vessels 6,000 d.w. tons and over						T-2 equiv.	Vessels under 6,000 d.w. tons	Grand total		
		No.	Steam	No.	Motor	No.	Total			No.	D.w. tons	Per cent
United States	3	431	7,872,584	10	159,502	441	8,032,086	514.2	479,234	772	8,511,320	15.26
British	2	217	4,365,051	300	4,057,015	517	8,422,066	480.1	347,869	740	8,769,935	15.72
Canadian	17	11	192,441	1	6,320	12	198,761	12.2	81,257	45	280,018	.50
Norwegian	4	43	1,010,378	409	7,285,577	452	8,295,955	484.9	113,407	507	8,409,362	15.07
Italian	7	63	1,266,288	62	951,780	125	2,218,068	132.6	72,074	176	2,290,142	4.11
French	6	53	1,183,793	63	1,238,741	116	2,422,534	148.5	120,660	179	2,543,194	4.56
Venezuelan	19	13	122,773	3	39,433	16	162,206	7.8	75,235	32	237,441	.43
Netherlands	9	57	1,024,051	47	689,892	104	1,713,943	100.6	73,357	138	1,787,300	3.20
Panamanian	5	138	2,917,776	48	808,522	186	3,726,298	228.9	41,681	198	3,767,979	6.75
German	12	11	225,376	23	391,941	34	647,317	37.9	78,810	91	726,127	1.30
Argentine	13	16	203,349	13	194,673	29	298,022	22.1	74,992	57	473,014	.85
Mexican	22	10	104,347	6	68,976	16	173,323	7.6	13,026	19	186,349	.33
Greek	15	14	236,941	6	76,055	20	312,996	17.9	27,833	38	340,829	.61
Brazilian	18	1	9,000	12	205,305	13	214,305	12.2	38,484	36	252,789	.45
Spanish	14	4	33,039	31	388,343	35	421,382	22.6	37,010	48	458,392	.82
Cuban	45								5,720	4	5,720	.01
Chilian	31	2	34,638			2	34,638	2.0	9,662	4	44,300	.08
Peruvian	33	1	6,089	1	6,000	2	12,089	.5	14,885	7	26,974	.05
Russian	16	4	50,530	16	157,299	20	207,829	9.7	96,808	70	304,637	.55
Danish	11			58	1,062,854	58	1,062,854	63.1	4,511	66	1,067,365	1.91
Honduran	21	7	166,315	3	45,344	10	211,659	12.7	1,523	12	213,182	.38
Portuguese	24	1	27,469	8	116,458	9	143,927	8.3	10,528	14	154,455	.28
Turkish	25	4	62,268	2	28,680	6	90,948	4.7	9,384	13	100,332	.18
Colombian	44								5,750	2	5,750	.01
Belgian	23	4	101,050	6	81,799	10	182,849	11.0	420	11	183,269	.33
Swedish	8	3	74,230	108	1,915,424	111	1,989,654	118.7	34,283	151	2,023,937	3.63
Finnish	20			15	227,035	15	227,035	12.6	1,719	17	228,754	.41
Yugoslavian	29			4	46,656	4	46,656	2.3	5,724	7	52,380	.09
Ecuadorian	48								2,439	2	2,439	.01
Uruguay	32	2	33,224			2	33,224	2.0	3,992	5	37,216	.07
Chinese	26	2	43,602	2	24,628	4	68,230	3.6	17,284	17	85,514	.15
Polish	27	1	12,020	3	39,445	4	51,465	2.5	11,309	9	62,774	.11
Swiss	54								440	1	440	.00
Philippine	43								7,144	6	7,144	.01
Paraguayan	49								1,015	1	1,015	.00
Moroccan	42								8,723	12	8,723	.02
New Zealand	47								3,325	1	3,325	.01
Lebanese	53								530	1	530	.00
Pakistan	40	1	9,760			1	9,760	.4	1,100	2	10,860	.02
Costa Rican	39	1	12,012			1	12,012	.5	1,465	3	13,477	.02
Tunisian												
Indo Chinese												
Indonesian	41								8,800	2	8,800	.02
Korean	38	1	7,420			1	7,420	.4	9,528	4	16,948	.03
Nicaraguan												
Austrian	52								697	1	697	.00
Japanese	10	41	836,016	35	698,596	76	1,534,612	90.7	128,730	165	1,633,342	2.98
Dominican Republic	46								4,765	2	4,765	.01
Liberian	1	326	9,155,945	63	1,042,709	389	10,198,654	652.2	25,195	400	10,223,849	18.33
Thailand	51								875	1	875	.00
Indian	35	1	10,172	1	13,125	2	23,297	1.2	1,700	4	24,997	.04
Irish	36	1	17,900			1	17,900	1.1	3,350	2	21,250	.04
Iceland	37			1	16,730	1	16,730	1.0	1,685	3	18,415	.03
Egypt	34	1	8,700	1	16,900	2	25,600	1.3		2	25,600	.05
Israeli	28	4	53,473			4	53,473	2.8		4	53,473	.10
South African												
Saudi Arabian	30	1	46,548			1	46,548	3.2		1	46,548	.08
Monaco												
Iranian	50								950	1	950	.00
Total		1,491	31,566,568	1,361	22,101,757	2,852	53,668,325	3,238.6	2,120,887	4,106	55,789,212	100.00

Note: The above includes 45 combination ore and tankships of 986,383 d.w. tons. Equivalent to 60.9 T-2's.

active vessels will ever return to petroleum trading under normal conditions.

Future Tonnage Requirements

Future tonnage requirements are, of course, dependent upon future world petroleum demand. This is a matter of speculation. If, however, it is arbitrarily assumed that the growth rate in free-world oil consumption will be 6% per year during 1958 through 1961, the tonnage requirements would be those included in Table 2. The projected supply patterns assume normal operations of all existing Middle East pipeline systems and reflect programed increases, but assume no brand-new pipelines. Oil moving from the Persian Gulf to areas west of Suez is routed via the Suez Canal with the exception of small volumes moving around the Cape of Good Hope to South America and the East Coast of the United States in vessels too large (economically) to use the canal.

These projected supply patterns still show annual growth rates for ocean-tanker requirements (after adjustment for pipeline increases) which are slightly greater than the annual growth rate for total oil demand. This relationship stems from the fact that the average world tanker haul continues to increase each year.

It should be emphasized that the growth in world-wide tonnage requirements is quite sensitive to oil-demand growth in free foreign areas and decidedly less sensitive to oil-demand growth in the U. S. This results from the fact that, roughly, only about 3 to 4 bbl. out of 10 take an ocean ride to satisfy average U. S. demand, whereas, slightly over 7 out of 10 require ocean transportation in the composite free foreign area. Furthermore, the average foreign haul is much longer than that pertaining to the U. S. Thus, over-all, the ability to gage correctly future world-wide industry tonnage requirements is dependent largely on the accurate estimation of oil supply-demand balances in the free-world outside the U. S. and to a lesser extent on forecasts of future supply-demand for the U. S. itself.

Today's Fleet

Table 3 shows the free-world commercial-tanker fleet as of October 1, 1958. The 2,651 vessels total about 50,669,000 d.w. tons and are equivalent to 3,050 T-2 tankers. The average tanker in the free-world fleet today is about 19,200 d.w. tons, an increase of 1,200 tons since a year ago. The world tanker fleet including government and military vessels (300 gross tons and over) is shown in Table 5 by flags of registry. The Liberian-flag fleet is now the largest, Great Britain second, and the U. S. third.

New tankers . . . As mentioned earlier, total new tanker deliveries from free world shipyards are running at all-time high rates. Approximately 317 T-2 equivalents of new tanker construction were delivered in the 9 months ending October 1 this year. Although it can be expected that some of the remaining 154 new T-2 equivalents indicated for 1958 will slip into 1959 (Table 1), new deliveries this year are estimated at 435 T-2 equivalents. The potential tonnage availability shown in the forecast table assumes delivery rates of new tankers at 360 T-2 equivalents in 1959; 325 in 1960 and 305 in 1961. Table 4 shows a breakdown of the tankers on order or under construction as of October 1, 1958. Whereas, only 23% of today's fleet is made up of vessels larger than 30,000 d.w. tons (Table 3), nearly 80% of the tonnage on order or under construction is for vessels over 30,000 d.w. tons (Table 4). Based upon past experience, the introduction of increasing numbers of the very large efficient tankers should be a factor in effecting earlier-than-normal scrapping of some of today's tied-up tonnage.

Obsolescence . . . The balances shown in Table 2 assume only a nominal scrapping rate, based on age, which eliminates 75% of vessels 20 years old or more at the beginning of any given year. It can be argued that, in view of current surpluses, this is a very conservative projection of scrapping rate. As mentioned before, a much higher economic obsolescence will probably result because of the relatively high cost of operating these older, smaller vessels compared with the very large modern tankers, especially in long-haul crude-oil trades where the draft at loading and unloading terminals is not a limitation.

Conclusions

The bright prospects for the future during the strong tanker market of 1955-1956, plus the added stimulus of the Suez Canal shutdown, apparently kicked off a tanker-building program which exceeds today's needs and has resulted in about 245 T-2's in tieup as of October 1, not to mention a considerable number of vessels operating at reduced speed, etc. Just how long the present surplus will remain depends upon the growth of world oil demand, future supply sources and trade routes (i.e. pipeline expansions, Suez Canal capacity), rate of new deliveries, obsolescence rate of older tankers, and the degree to which the free world may wish to protect itself against an international emergency by deliberately maintaining a sizable laid-up fleet in a standby status.

BOOK

MODERN METHODS OF PLANT MANAGEMENT. Published by Factory Management and Maintenance, McGraw-Hill Publishing Co., Inc., 330 West Forty-second Street, New York 36. 128 pp. $100.

This volume discusses plant organization, cost analysis and control, supervisory relations, plant safety, inspection and quality control, maintenance, materials handling and plant layout, work measurement and wage incentives, and production and inventory control.

There is also a section on employe relations.

Arsenic is found in many crudes

THIS is the conclusion reached by investigators at the Dowell Division, Dow Chemical Co., Tulsa. They used the standard Ultramicro Gutzit analysis in determining the arsenic content of 10 crudes from widely scattered points throughout the United States. None of the wells producing these crudes had been chemically treated in any way. These findings are particularly important since many refining catalysts are extremely sensitive to arsenic in concentrations of 10 parts per billion or more.

The accompanying table shows formation, location, API gravity, and arsenic content for the 10 crudes that were analyzed.

ARSENIC CONTENT OF NATURAL CRUDE OIL

Formation and location—	°API gravity	Arsenic content in parts per billion (p.p.b.)
Tar Springs—Wabash County, Illinois	28.0	53
Clearfork—West Texas	35.0	189
Bromide sand—McClain County, Oklahoma	40.6	None found
Cherokee—Alfalfa County, Oklahoma	37.6	64
Oriskany lime—Fairfield County, Ohio	41.0	40
Paradox—San Juan County, Utah	42.6	182
Clinton sand—Perry County, Ohio	43.0	3,650
Niobrara—Carbon County, Wyoming	43.4	49
Bromide sand—Grady County, Oklahoma	51.4	None found
Travis Peak—Kilgore, Tex.	55.0	27

Power for distillation-type processes

BY W. L. NELSON
Technical Editor-Refinery Consultant

Schedule for Process Costimating

No. 36 Dec. 29—Power for Distillation-Type Processes.

No. 37 Jan. 5—Optimum Pressure for Vacuum Distillation.

No. 38 Jan. 12—Water for Distillation-Type Processes.

No. 39 Jan. 26—Cost of Operating Vacuum-Distillation Plants.

No. 40 Feb. 2 — Fractionation-Type Processes Operating Costs.

No. 41 Feb. 9—Average Wages and Number of Employes.

No. 42 Feb. 23—Index of Process Costimating Series.

POWER COST AND INDEXES

	Electricity		Steam	
	Cost ct./kw.hr.*	Index*	Cost ct./M. lb.‡	Index
1926	0.92	108.0†	...	...
30	0.90	106.0	...	...
34	0.85	100.0†	19.9	38
38	0.80	95.0†	18.8	36
42	0.76	90.0†	20.5	41
46	0.90	106.5	27.5	53
50	0.83	97.3	36.9	71
1951	0.83	97.5	42.3	81
52	0.83	97.9	43.1	83
53	0.84	98.2	46.1	88
54	0.84	98.5	45.8	88
55	0.84	99.2	48.6	93
56	0.85	100.0	52.3	100
57	0.86	101.3	55.7	106

*Wholesale Prices, Bureau of Labor Statistics, U. S. Dept. of Labor. The figures since 1950 are different from those shown in Process Costimating No. 13, May 19, 1958, p. 181, because of revisions of the bureau. †Estimated. ‡Based on 20% reuse of steam. See Process Costimating No. 18 (June 30, 1958, p. 103).

ONLY THREE major power requirements are involved in distillation processes, namely, (1) the pumping of the feed, (2) the pumping of products, and (3) the pumping of reflux. In addition, water circulation requires power, the crude still gas from large topping plants is sometimes compressed into the refinery gas-recovery system, and steam may be used in large amounts to actuate steam jet ejectors. However, these power consumptions are usually treated as separate items rather than being included in the power requirement.

The power for the feed and product pumps introduces little difficulty except that the pressure of the feed pump must be estimated. Pressures are somewhat as shown in Table 1. Thus the power amounts to handling all of the oil twice, once as feed at a high pressure, and again as products at a lower (usually) pressure. Occasionally the products go to storage by gravity, or from a pressure system without a pump, but if the products are storage under pressure, it is necessary to use a pump. The power required can be obtained from the equations of Process Costimating No. 23, "Efficiencies and Power Required in Estimating Pumping Costs" (Aug. 18, 1958, p. 221), or for steam pumps, Process Costimating No. 21 (July 28, 1958, p. 187). One horsepower is the equivalent of 0.745 kw.-hr. of electrical power.

The amount of reflux varies so widely that it presents more of a problem. If possible, the reflux should be computed or estimated but the values shown in Table 2 are indicative of the ranges ordinarily encountered. The differential pressure required in handling reflux is usually small (15-40 psi.).

TABLE 1—INDICATION OF PUMP PRESSURES

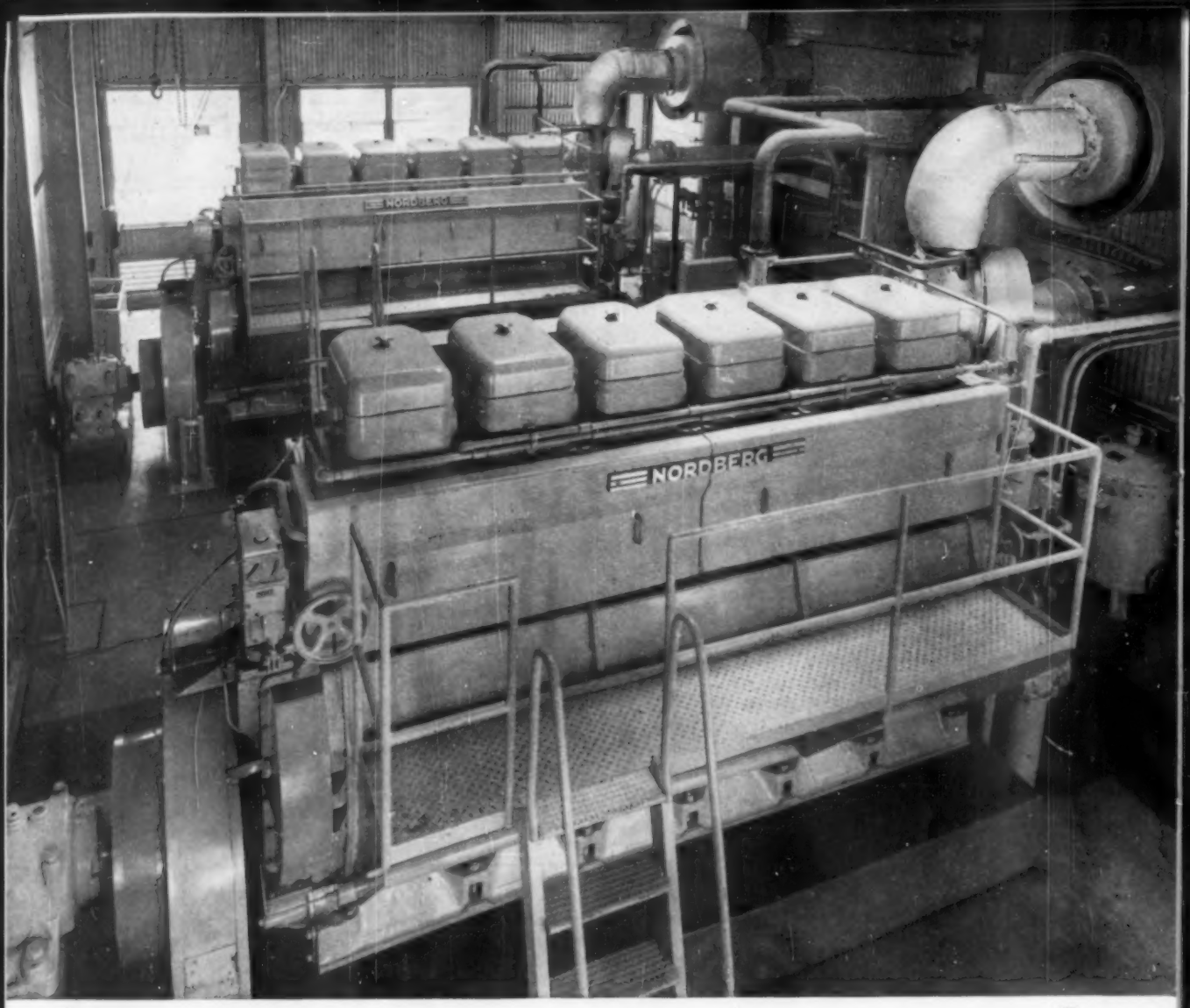
	Differential pressure, psi.
A. Through pipe still and exchanger systems	*100-180
Through pipe still, etc., into tower	add tower psi.
B. Through exchangers only	15-30
Through exchangers only into tower	add tower psi.
C. Products to storage (line and elevation)	10 plus line loss

*Varies mainly by amount of vaporization (or temperature) and whether steam is or is not introduced into the pipe still tubes.

TABLE 2—INDICATION OF REFLUX QUALITIES FOR ESTIMATING POWER REQUIREMENTS

	Cold reflux ratio*	
	On overhead product	On feed
Crude flash	†0.5-2.4	0.2-0.4
Topping	†1.8-4.0	0.6-0.8
Rerunning operations	†1.0-2.5	...
Vacuum flash	†0.5-2.0	0.2-0.45
Vacuum distillation	†0.7-3.2	0.5-0.8
Solvent fractionators	†1.5-3.0	0.5-2.0
Debutanizer	‡1.6-3.3	...
Depropanizer	‡2.4-4.0	...
Deisobutanizer	‡0.4-6.5	...
Deisopentanizer	‡15-18	...

*Either side or top reflux or combinations. †High value usually caused by a small overhead product. ‡Hot reflux is usually about 25% larger.



0550

Pipe line engines by Nordberg

Remote control, unattended operation of four turbocharged Duafuel® Nordberg engine-pumping units in two stations on a crude line operated by The Texas Pipe Line Company.

NORDBERG MANUFACTURING COMPANY
MILWAUKEE 1, WISCONSIN

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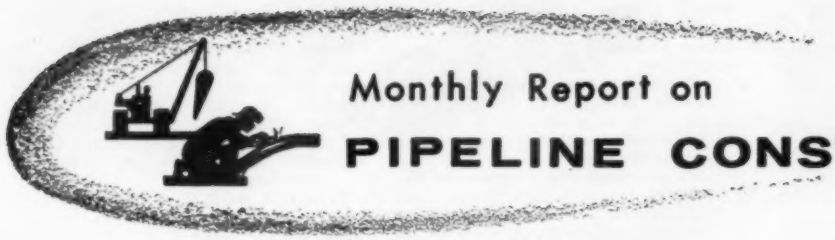

Monthly Report on PIPELINE CONSTRUCTION

PIPELINE CONSTRUCTION

PIPELINE ACTIVITY reported here is compiled from surveys by The Oil and Gas Journal among pipeline companies and construction contractors.

This summary report appears in the last issue of the Journal each month. New construction projects are reported weekly in Pipeline Briefs in the Journal's news section.

Projects are listed in three groups—U. S., Canadian, and Foreign—and according to type of line—crude, products, or natural gas.

U. S. Crude Oil Pipelines

- **Ashland Oil & Refining Co.,** Ashland, Ky.
  Project: 42 miles of 6-in., 30 miles of 8-in. from near Greensburg to Louisville, Ky.
  Status: Under way.
  Completion: April 1, 1959.
- **Cape Pipe Line Co.** (Sun Oil Co., Cities Service Co., Atlantic Refining Co.), Philadelphia.
  Project: Line from lower Delaware Bay to Philadelphia.
  Status: Planned.
  Completion: 1960.
- **Gillette Pipeline, Inc.,** and **A. W. Hartwig, Inc.**
  Project: A 102-mile line from Dead Horse Creek field to Casper, Wyo.
  Status: Pending Wyoming Public Service Commission approval.
- **Great Northern Railway Co.**
  Project: 400 to 600 miles of 12 to 20-in. from Williston basin in Mont. and N. D., to Clearbrook or St. Paul, Minn.
  Contractor: **Pipe Line Technologists, Inc.,** Houston, has completed feasibility study.
- **International Oil Pipeline Corp.,** New York City.
  Project: Would own U. S. section of 1,500-mile, 30-in. line proposed by Mid-Continent Pipe Lines, Ltd., from Edmonton, Alta., to Chicago. (See Canadian Crude-Oil Pipelines).
  Status: Pending Canadian Board of Transport Commission approval.
- **International Refineries, Inc.,** Minneapolis.
  Project: Gathering lines in Newburg pool in Bottineau Co., N. D.
  Status: Has applied to N. D. Public Service Commission for approval.
- **Northwestern Refining Co.,** St. Paul Park, Minn.
  Project: Gathering lines in Newburg pool in Bottineau Co., N. D.
  Status: Has applied to N. D. Public Service Commission for approval.
- **Union Oil Co. of California,** Los Angeles.
  Project: 1 mile of 30-in. from Los Angeles Outer Harbor to Los Angeles Harbor Terminal.
  Status: Under way.
  Contractor: **Engineers Limited Pipeline Co.,** San Francisco.
  Completion: January 15, 1959.

U. S. Products Pipelines

- **Alaska-Yukon Refiners & Distributors, Ltd.,** Edmonton, Alta.
  Project: Two lines: one 150 miles from Haines to Haines Junction, Alaska, linking with government Canol line; another from Tok Junction, on Canol line, to Anchorage, Alaska.
  Status: Proposed.
  Completion: February 1959.
- **Katy and New York Central Railroads.**
  Project: 2,500 miles of 10-in. and smaller LPG line from Houston through Kansas City, St. Louis, Indianapolis, and Cleveland to Syracuse, then down to New York City. A branch would go through Chicago to Detroit.
  Status: Proposed.
  Contractor: **Williams Brothers Co.,** Tulsa, has completed feasibility study.
  Completion: November 1, 1959.
- **Underground Storage & Exploration, Inc.,** Upper Darby, Pa.
  Project: 393 miles of 12-in. LPG line from Moundsville, W. Va., to Newark, N. J., plus 95 miles of 6, 8-in. laterals to Mauch Chunk, Pa., and to Philadelphia.
  Status: Proposed.
- **Union Oil Co. of California,** Los Angeles.
  Project: 1 mile of 2 through 12-in. bunker fuel lines from Los Angeles Harbor Terminal to Los Angeles Outer Harbor.
  Status: Under way.
  Contractor: **Engineers Limited Pipeline Co.,** San Francisco.
  Completion: January 15, 1959.

U. S. Natural Gas Pipelines

- **American Louisiana Pipe Line Co.,** Detroit.
  Project: 28 miles of 12-in. Big Lake, La., gathering lines.
  Status: Pending FPC approval.
  Completion: March 1959.
- **Arkansas Industrial Pipeline Corp.** (Arkansas Louisiana Gas Co.), Shreveport, La.
  Project: 130 miles of 18-in. from Perla to Helena, Ark.
  Status: Planned.
- **Arkansas Louisiana Gas Co.,** Shreveport, La.
  Project: A 300-mile line, plus gathering lines, from Tex.-La. coastal area to northern La., to connect with present system.
  Status: Proposed.
  Project: 100 miles of 16-in. from Clarksville to Perla, Ark.
  Status: Planned.
- **Central Hudson Gas & Electric Corp.,** Poughkeepsie, N. Y.
  Project: 4 miles of 8-in. from Temple Hill Tap to Newburgh, N. Y., 1 mile of 10-in. from Highland to Kingston (Part I), N. Y.
  Status: Planned.
  Completion: June 1959.
  Project: 13 miles of 10-in. from Highland to Kingston (Part II), N. Y.
  Status: Planned.
  Completion: 1960.
- **Coastal States Gas Producing Co.** and **Southern Coast Corp.,** Corpus Christi, Tex.
  Project: 45 miles of 2 to 10-in. in Bee Co., Tex., to connect shut-in fields with Texas Eastern Transmission Corp.'s system.
  Status: Planned.
- **Coastal Transmission Corp.,** Houston.
  Project: 94 miles of 12-in. from McAllen to Robstown, Tex.; 147 miles of 20-in. from Robstown to Bay City, Tex.; 68 miles of 22-in. from Bay City to Galveston Bay, Tex.; 252 miles of 24-in. from Galveston Bay to Baton Rouge, La.
  Status: Under way.
  Contractor: **Oklahoma Contracting Co.,** Dallas, has 127 miles of 24-in. in La., and 147 miles of 20-in. in Tex. **O. R. Burden Construction Corp.,** Tulsa, has 94 miles of 12-in. **Brown & Root, Inc.,** Houston, has 11 miles of 24-in. across Galveston Bay. **River Construction Co.,** Fort Worth, has 105 miles of 24-in. from Galveston Bay to north of Lake Charles, La., to complete May 1, 1959, T. M. Tatom, spread supt. **Buddy Sherrod, Inc.,** Conroe, Tex., has the Natchez River crossing between Beaumont and Port Arthur, Tex.
  Completion: April 1959.
  Project: 320 miles of 3 to 14-in. gathering lines at various locations on Tex. and La. Gulf Coast.
  Status: Approved.
  Completion: April 1959.
- **Colorado Interstate Gas Co.,** Colorado Springs, Colo.
  Project: 109 miles of 26-in. from Four-Way station in Tex. Panhandle, to Morton Junction in southeastern Colo.; 135 miles of 34-in. from there to Pueblo, and 100 miles of 30-in. on to Denver; 148 miles of 34-in. from CIG line at Rock Springs, Wyo., to Provo, Utah, to connect with proposed El Paso Natural Gas Co.'s line to Calif.
  Status: Planned.
  Completion: January 1, 1960.
- **Consumers Power Co.,** Jackson, Mich.
  Project: 40 miles of 24-in. from Woodbury station to Laingsburg Junction, Mich.
  Status: Planned.
  Completion: July 15, 1959.
  Project: 120 miles of 26-in. from Mich.-Ind. border connection with Trunkline Gas Co., to Plymouth, Mich., and 20 miles of 24-in. from Northville to Clarkston, Mich.
  Status: Planned.
  Completion: September 1, 1959.
- **El Paso Natural Gas Co.,** El Paso, Tex.
  Project: 22 miles of 4 through 12-in. in San Juan basin.
  Status: Planned.
  Contractor: **B. C. Hall Constructors, Inc.,** Aztec, N. M., C. E. Rutledge, spread supt.
  Project: 400 miles of 34-in. from Salt Lake City, to Calif. border near Las Vegas, Nev.
  Status: Planned.
  Completion: September 1, 1959.
  Project: 1,000 miles of main line loop from Plains, Tex., to Calif. border.
  Status: Planned.
  Completion: 1960.
- **Gulf Interstate Gas Co.,** Houston.
  Project: 10 miles of 12-in. supply loop

PIPELINE CONSTRUCTION

to Erath field, Vermilion Parish, La., and 9 miles of various-size field lines in Acadia and Vermilion parishes, La..

Status: Approved.

Project: 10 miles of 20-in. loop in Jefferson Davis and Vermilion parishes, La., and 3 miles of 6-in. loop in Cameron Parish, La.

Status: Has temporary FPC approval.

• **Gulf Resources, Inc., Dallas.**

Project: 125-mile line from Lopeno field in Zapata Co. to a point in LaSalle Co., Tex.

Status: Proposed.

• **Houston Texas Gas & Oil Corp.,** St. Petersburg, Fla.

Project: 679 miles of 24-in. from Baton Rouge, La., to Kissimmee, Fla.; 138 miles of 18-in. and 97 miles of 20-in. from Kissimmee to Cutler, Fla.; 702 miles of 3 through 18-in. sales laterals in Fla. Main line will join Coastal Transmission's line from McAllen, Tex., to Baton Rouge, La.

Status: Under way.

Contractor: **Midwestern-Walco Contractors,** St. Petersburg, Fla., has the 24-in. with spread offices at Denham Springs, La., Lacedale, Miss., and Vernon, Fla. **Harbert Construction Corp.,** Birmingham, has remainder, of which 150 miles of 3 to 16-in. Fla. laterals have been subcontracted to **Mid-States Construction Corp.,** Mt. Vernon, Ill.

Completion: June 1959.

• **Humble Oil & Refining Co.,** Houston.

Project: 250 miles of 26 or 30-in. from Sw. Tex. to Houston.

Status: Planned.

Completion: 1960.

• **Iron Ranges Natural Gas Co.,** St. Paul.

Project: 70 miles of 6 to 16-in. in Mesabi Iron Range area.

Status: Pending FPC approval.

Completion: 1959.

Project: 63 miles of 12-in. between Duluth and Silver Bay, Minn.

Status: Pending FPC approval.

Completion: 1959.

• **Michigan Consolidated Gas Co.,** Detroit.

Project: 67 miles of 10, 12-in. between Sears and Traverse City, Mich.

Status: Under way.

Contractor: **Somerville Construction,** Ada, Mich., Floyd Huduall, supt., office at Cadillac, Mich.

Project: 60 miles of 10, 12-in. between Muskegon and Ludington, Mich.

Status: Under way.

Contractor: **Somerville Construction Co.,** Ada, Mich., jointly with **H. L. Gentry Construction Co.,** Jackson, Mich., Frank Morris, supt., office at Hart, Mich.

• **Michigan Wisconsin Pipe Line Co.,** Detroit.

Project: 373 miles of 24-in. main line loop; 21 miles of 16-in. loop in Wis.

Status: Pending FPC approval.

Completion: July 1, 1959.

• **Midwestern Gas Transmission Co.,** Houston.

Project: 350 miles of 30-in. from Portland, Tenn., to Joliet, Ill.

Status: Pending FPC approval.

Completion: Planned for 1959.

• **Mississippi River Transmission Corp.** (Mississippi River Fuel Corp.), St. Louis.

Project: 115 miles of 24-in. from near Oran in southeast Mo., north between Ste. Genevieve and Bonne Terre into vicinity of Herculaneum and Pevely then into St. Louis Co.

Status: Planned.

Completion: Last half 1960.

• **Mountain Fuel Supply Co.,** Rock Springs, Wyo.

Project: 5 miles of 8-in. and 1 mile of 6-in. south of Rock Springs, Wyo.

Status: Planned.

Completion: July 1959.

• **North Carolina Natural Gas Corp.,** Fayetteville, N. C.

Project: 730 miles of 2 to 16-in. from near Mooresville, eastwardly across N. C.

Status: Under way.

Contractor: **Somerville Construction Co.,** Ada, Mich., has 100 miles of 10, 12-in. from Lumberton to Goldsboro, N. C., to complete March 1, 1959, Mike Larsen and Charles Copeland, supts., office at Fayetteville.

Completion: April 1, 1959.

• **Northern Illinois Gas Co.**

Project: 140 miles of 24-in. from Des Plaines to East Dubuque, Ill.

Status: Pending FPC approval.

Contractor: **Williams Brothers Co.,** Tulsa, has completed engineering and right-of-way studies.

• **Northern Natural Gas Co.,** Omaha, Neb.

Project: 18 miles of 20-in. from Dubuque, Iowa, to Menominee, Ill.

Status: Pending FPC approval.

Project 19 miles of 30-in. from Oakland to Ogden, Iowa.

Status: Pending FPC approval.

Project: 9 miles of 30-in. from Palmyra to Beatrice, Neb.

Status: Pending FPC approval.

Project: 11 miles of 30-in. from Clifton to Tescott, Kans.

Status: Pending FPC approval.

Project: 8 miles of 30-in. from Tescott to Bushton, Kans.

Status: Pending FPC approval.

Project: 11 miles of 30-in. from Sunray, Tex., to Beaver, Okla.

Status: Pending FPC approval.

Project: 8 miles of 30-in. from Beaver, Okla., to Mullinville, Kans.

Status: Pending FPC approval.

Project: 169 miles of 20-in. from Farmington, Minn., to Superior, Wis.

Status: Pending FPC approval.

Project: 23 miles of 24-in. main line loop in Neb.

Status: Pending PFC approval.

Project: 44 miles of 16-in. in Duluth-Superior, Wis., area.

Status: Pending FPC approval.

Project: 57 miles of 30-in. main line loop in Iowa, Minn., Neb. and Kans.

Status: Pending FPC approval.

Project: 188 miles of 24-in. and 215 miles of 30-in. from Farmington, Minn., to International border.

• **Northern Utilities Co.,** Casper, Wyo.

Project: 35 miles of 16-in. in Fremont-Natrona counties, Wyo.; 8 miles of 12-in. near Casper, Wyo.; 6 miles of 8-in. from Sand Draw gas field to Beaver Creek field, Wyo.; 12 miles of 6-in. from Beaver Creek field to the system servicing the Riverton-Lander, Wyo., area.

Status: Planned.

• **Offshore Gathering Corp.,** Houston.

Project: 364 miles in Gulf of Mexico off La.: 60 miles of 24-in., 70 miles of 26-in., and 234 miles of 30-in. dual line.

Status: Pending FPC approval.

• **Pacific Gas & Electric Co.,** San Francisco.

Project: 131 miles of 34-in. looping of Topock-Milpitas main line.

Status: Planned. Pending FPC approval.

Completion: 49 miles in 1959; 82 miles in 1960.

Project: 42 miles of 3-in. from Pittsburgh to Irvington, Calif.

Status: Planned.

Completion: 11 miles in 1959; 31 miles in 1960.

• **Pacific Lighting Gas Supply Co.,** Los Angeles.

Project: 128 miles of 34-in. from Topock, Ariz., to Newberry, Calif.

Status: California Public Utilities Commission has granted certificate contingent upon FPC approval of Transwestern Pipeline Co.'s proposed project terminating at Topock, Ariz.

Completion: November 1, 1959.

• **Pacific Northwest Pipeline Corp.,** Salt Lake City.

Project: 2 miles of 4-in. from a point on 22-in. main line in Baker Co., Ore., to Lime, Ore.; 12 miles of 4-in. from a point on 26-in. main line in Klickitat Co., Wash., to The Dalles, Ore.

Status: Pending FPC approval.

• **Pennsylvania Gas Co.,** Warren, Pa.

Project: 23 miles of 10-in. in Erie Co., Pa., 15 miles of 8-in. in Warren and Chautauqua counties, Pa.; 30 miles of branch lines, and several small distribution lines.

Status: Approved.

• **Peoples Natural Gas Co.,** Pittsburgh.

Project: 30 miles of 20-in. from Bentleyville to Imperial, Pa.

Status: Planned.

Completion: July 1959.

• **Permian Basin Pipeline Co.,** Omaha, Neb.

Project: 61 miles of 16-in. and 11 miles of field lines in Winkler Co., Tex.

Status: Approved October 1958.

• **Piedmont Gas Co.,** Hickory, N. C.

Project: 78 miles of 2 to 8-in. extension off Transcontinental in N. C., to serve Gaston, Lincoln, Catawba, Caldwell, and Burke counties.

Status: Approved.

• **Pioneer Natural Gas Co.,** Amarillo Tex.

Project: 21 miles of 12-in. from Sudan to Muleshoe, Tex.

Status: Pending FPC approval.

Completion: March 1, 1959.

Project: 12 miles of 10-in. from Muleshoe, Tex., northward.

Status: Pending FPC approval.

Completion: March 1, 1959.

• **Signal Oil & Gas Co.,** Los Angeles.

Project: Extension of gathering system from Tioga, N. D., to near the Canadian border in Burke Co.

Status: Being considered.

• **Southern California Gas Co.** and **Southern Counties Gas Co.,** Los Angeles.

Project: 186 miles of 34-in. from Ivanpah Lake to Placentia, Calif.

Status: Proposed.

• **Southern Natural Gas Co.,** Birmingham, Ala.

Project: Supply lines in S. La.: 9 miles of 16-in. Bayou Long field lateral, 7 miles of 16-in. Little Bayou Pigeon lateral, 4 miles of 6-in. Mystic Bayou field lateral, 2 miles of 6-in. East Bayou Pigeon lateral, 13 miles of 10-in. Tantine field lateral, 46 miles of 20-in. from White Castle to South Section 28 field, 7 miles of 10-in. Bayou Boullion field, 11 miles of 8-in. East Happytown field lateral, 17 miles of 10-in. Loisel field lateral, 16 miles of 20-in. Lake Washington field lateral, 25 miles of 12-in. West Delta Block 30 lateral, 4 miles of 8-in. Bayou Long field lateral, 6 miles of 4-in. Bayou Villars field lateral, 12 miles of 6-in. Marrero field lateral, 6 miles of 6-in. South Lake Long field lateral, 1 mile of 4-in. Tigers Ridge field lateral, 35 miles of 16-in. Barataria Line loop.

Status: Under way.

Contractor: **Western Pipeline, Inc.,** Austin, Tex., has 46 miles of 20-in., 14 miles of 16-in., 14 miles of 10-in., 23 miles of 8-in., and 7 miles of 6-in. **Brown & Root, Inc.,** Houston, has 16 miles of 20-in., 14 miles of 16-in., 25 miles of 12-in., 2 miles of 8-in., 12 miles of 6-in., and 6 miles of 4-in.

Project: 79 miles of 16-in. from Ocmulgee to Wrens, Ga.; 62 miles of 14-in. from Ocmulgee to Atlanta, Ga.

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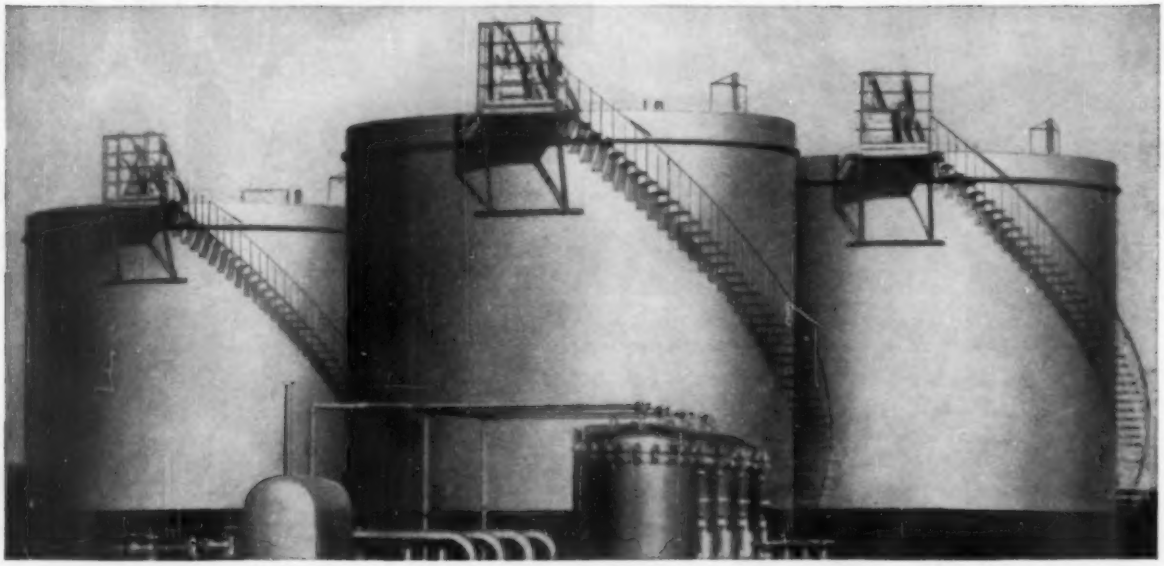

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PIPELINE CONSTRUCTION

Status: Pending FPC approval.

Project: Facilities to attach additional supplies in S. La.: 2 miles of 8-in. Coffee Bay field lateral, 2 miles of 4-in. Bayou Postillion lateral.

Status: Pending FPC approval.

Completion: 1958-1959.

Project: Facilities to attach additional supplies in Miss.: 8 miles of 8-in. Hub field lateral, 40 miles of 14-in. and 40 miles of 16-in. from Cranfield to Gwinville, 3 miles of 8-in. Dexter field lateral.

Status: Pending FPC approval.

Completion: 1958-1959.

- **South Georgia Natural Gas Co.,** Thomasville, Ga.

Project: Lines in Ga.: 2 miles of 2-in. near Meigs; 31 miles of 3-in. near Nashville; 41 miles of 4-in. and 39 miles of 6-in. near Tifton.

Status: Planned.

Completion: Summer 1959.

- **Tennessee Gas Transmission Co.,** Houston.

Project: 21 miles of 16-in. and 2 miles of 12-in. to offshore La. fields.

Status: Pending FPC approval.

Project: 158 miles of 36-in. loop in La. and Miss.

Status: Pending FPC approval.

Completion: Planned for 1959.

- **Tensas Gas Gathering Corp.**

Project: 37 miles of 2 to 8-in. from Rodney field, Miss., westerly to connect with Olin Gas Transmission Co.'s line in Tensas Parish, La.

Status: Approved.

- **Texas Eastern Transmission Corp.,** Shreveport, La.

Project: 22 miles of 14-in. from Opelousas station to Rayne Field, La.

Status: Under way.

Contractor: **Houston Contracting Co.,** Houston.

Completion: 1959.

Project: 13 miles of 30-in. from Grennup Co., Ky., to Scioto Co., Ohio; 16 miles of 30-in. from Noble Co. to Monroe Co., Ohio.

Status: Pending FPC approval.

Completion: 1959.

Project: 13 miles of 30-in. in Bucks Co., Pa.; 81 miles of 24-in. from Leidy Storage field to Perulack Station, Pa.; 66 miles of 30-in. from Delmont, Pa., to Lambertville, N. Y.; 23 miles of 20-in. from Station 25 to Chester Junction, Pa.

Status: Pending FPC approval.

Completion: 1959.

Project: 40 miles of 36-in. from Station 26 to Station 27 in N. J., and 4 miles of 30-in. from Station 27, N. J., to Staten Island, N. Y.

Status: Pending FPC approval.

Completion: 1959.

- **Texas Gas Transmission Corp.,** Owensboro, Ky.

Project: 30-in. looping program: 50 miles near Alexandria, La.; 24 miles near Bastrop, La.; 9 miles near Greenville, Miss., 9 miles near Clarksdale, Miss.

Status: Approved. Under way.

Completion: 1959.

Contractor: **Houston Contracting Co.,** Houston, has completed 30 miles in vicinity of Pineville and Bastrop, La.

Project: 26-in. looping program: 9 miles near Hardinsburg, Ky.; 10 miles near Louisville, Ky.

Status: Approved.

Completion: 1959.

Project: 8 miles of 10-in. near Petersburg, Ind.; 5 miles of 16-in. near Dixie, Ky.; 2 miles of 6-in. near Linton, Ind.; 1 mile of 6-in. near Lawrenceville, Ill.

Status: Approved.

Completion: 1959.

- **Texas Illinois Natural Gas Pipeline Co.,** Chicago.

Project: 860 miles of 30-in. looping of present system.

Status: Planned.

Completion: 1960-1961.

- **Transcontinental Gas Pipe Line Corp.,** Houston.

Project: 1 mile of 30-in. and 51 miles of 36-in. main line loops in various states.

Status: Approved. Under way.

Completion: 1959.

Project: 52 miles of 10, 14-in. purchase laterals in Tex. and La.

Status: Approved.

Project: 149 miles of 36-in. main line loops from La. into Ga., plus a 20-in. gathering line from Vermilion Block 76 offshore La., to Cow Island junction near the shore line, and 13 miles of 24-in. loop of a purchase lateral in S. La.

Status: Pending FPC approval.

Completion: November 1959.

- **Transwestern Pipe Line Co.** (Warren Petroleum, Monterey Oil Co., J. R. Butler), Dallas.

Project: 635 miles of 24-in. from Perryton and Fort Stockton, Tex., to Roswell, N. M., and 670 miles of 30-in. from Roswell to Topock, Ariz.

Status: Pending FPC approval.

Completion: Mid-1959.

- **Trunkline Gas Co.,** Houston.

Project: 464 miles of 30-in. from Longville, La., to Tuscola, Ill.; 204 miles of 26-in. from Bourbon, Ill., to Mich. state line in N. Ind.

Status: Pending FPC approval.

Completion: September 1959.

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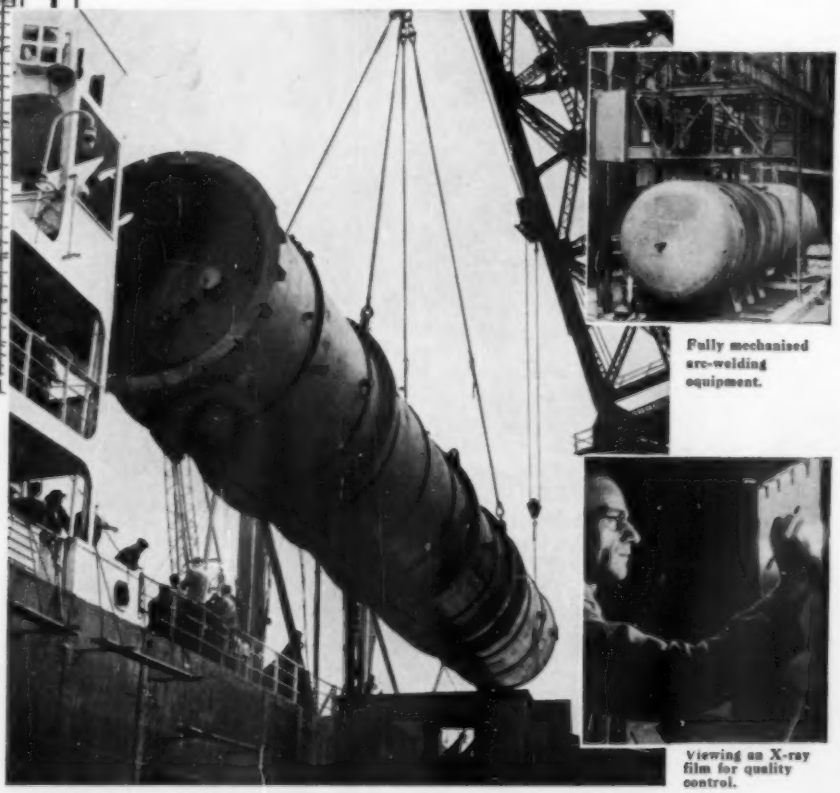

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PIPELINE CONSTRUCTION

Project: 45 miles of 24-in. from Trinity River in Liberty Co. to Neches River in Hardin Co., Tex.
Status: Pending approval.
Completion: May 1959.
Project: 33 miles of 20-in., 31 miles of 16-in., 34 miles of 12-in., and 45 miles of 14-in. from Lowry, La., to Blocks 67 and 26 in. Vermilion and Cameron parishes, La.
Status: Pending FPC approval.
Completion: July 1959.
Project: 32 miles of 6, 8, 10, 12-in. from Katy to Hitchcock, Tex.
Status: Pending FPC approval.
Completion: June 1959.
Project: 24, 26-in Red River crossing in Rapides Parish, La.
Status: Under way.
Contractor: **Missouri Valley Dredging Co.,** Omaha.
Completion: January 1959.

- **United Fuel Gas Co.,** Charleston, W. Va.

Project: 10 miles of 12-in. from Wurtland to Greenup Measuring Station, Ky.
Status: Planned.

- **United Gas Pipe Line Co.,** Shreveport, La.

Project: 117 miles of 30-in. looping from SE La., to Mobile, Ala.
Status: Approved. Under way.
Contractor: **O. R. Burden Construction Corp.,** Tulsa, has completed the 28-mile Lake Pontchartrain crossing. **Williams Bros. Co.,** Tulsa, has completed 37 miles from Lyman to Helena, Miss.
Completion: Early 1959.

- **Valley Gas Transmission, Inc.** (Fish Engineering Corp.), Houston.

Project: 150 to 160 miles of 3 to 6-in. gathering lines to tap fields in Starr, Hidalgo, Brooks, and Jim Wells counties, Tex.
Status: Pending FPC approval, with plans to get under way in December 1958.
Completion: First 100 miles to be completed mid-January 1959; remainder by summer 1959.

Canadian Crude Oil Pipelines

- **Act Oils, Ltd.**

Project: A 450-mile line from the Peace River region of northern B. C. to tidewater at Kitimat, B. C.
Status: Pending British Columbia Government approval.

- **B-A Alberta Pipe Line, Ltd.,** Calgary, Alta.

Project: 35 miles of 8-in. to connect Drumheller field, Alta., with existing lines running to Edmonton.
Status: Pending approval.

- **Bituminous Oil Pipeline Co.** (Royalite Oil Co., and Can-Amera Oilsands Development, Ltd.)

Project: A 250-mile line from Athabasca oil sands in northeastern Alta., to Edmonton.
Status: Proposed.
Completion: 1960.

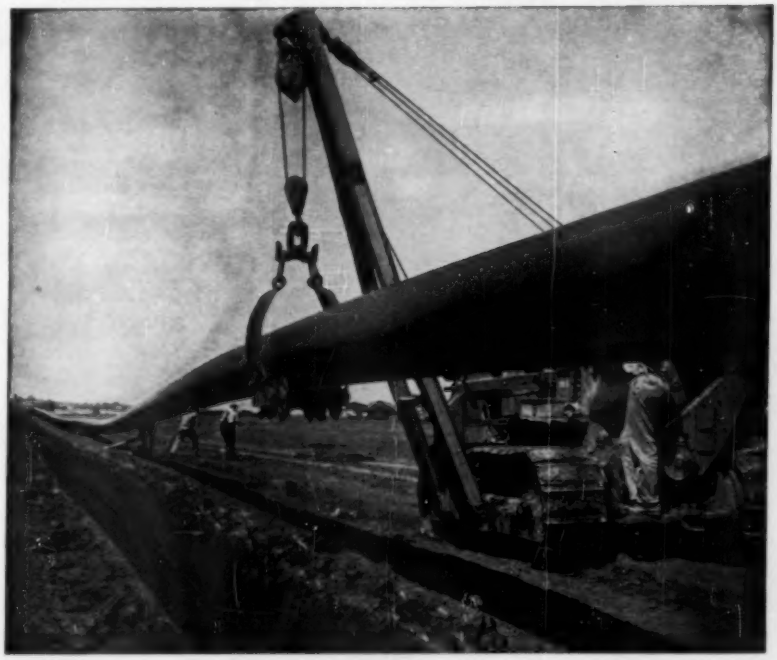
- **Independent Pipe Line Co.** (Home Oil Co.), Calgary.

Project: 1,073 miles of 36-in. from Edmonton, Alta., to Superior, Wis.; 946 miles of 34-in. from Superior to Montreal, Que.; 72 miles of 16-in. and 74 miles of 10-in. feeder lines from Calgary to Bellshill Lake, Alta., on the 36-in. line.
Status: Proposed.

- **Mid-Continent Pipe Lines, Ltd.,** Edmonton, Alta.

Project: 1,500 miles of 30-in. from Edmonton to Chicago, via Sask., N. D., Minn., Wis., and Ill. U. S. section to be owned

Canada uncorks its gas resources



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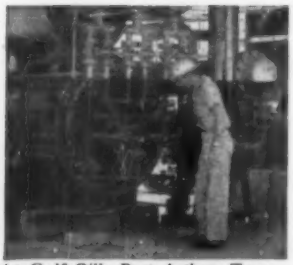

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PIPELINE CONSTRUCTION

by International Oil Pipeline Corp., New York City.

Status: Pending Canadian Board of Transport Commission approval. **W. C. Gilman & Co.**, New York City, has made preliminary study.

- **Peace River Oil Pipe Line Co., Ltd.**, Calgary, Alta.

Project: 8 miles of 6-in., 45 miles of 8-in., and 17 miles of 12-in. from its Fox Creek Pump Station to Windfall, Virginia Hills, and Swan Hills fields in Alta.

Status: Approved.

- **Westcoast Transmission Co., Ltd.**, Calgary.

Project: Line to parallel its 650-mile, 30-in. gas line from Peace River to Vancouver, B. C.

Status: Under way.

Canadian Products Pipelines

- **Foothills Products Pipe Line, Ltd.** (Pembina Pipe Line Co., Mannix Co., Ltd.), Calgary, Alta.

Project: Gathering system to connect Alta. gasoline plants to trunk line from Alta. to Pacific Coast.

Status: Proposed.

- **Hydrocarbons Pipeline Co.**, Winnipeg, Man.

Project: 800 miles of 6, 8-in. LPG line from near Edmonton to Fort William, Ont.

Status: Has Parliament of Canada approval. Seeking approval of Federal Board of Transport Commissioners and the Alberta Petroleum and Natural Gas Conservation Board.

Contractor: **Dutton - Williams Brothers, Ltd.**, Calgary, and **A. D. Little Co.**, Boston, are consultants.

- **Pembina Pipe Line, Ltd.**, Edmonton, Alta.

Project: A 1,200-mile line to carry sulfur, LPG, and natural gasoline from Alta.'s gas fields to eastern Canada.

Status: Proposed.

Canadian Natural Gas Pipelines

- **Alberta & Southern Gas Co., Ltd.** (Pacific Gas & Electric Co.), Los Angeles, and **Westcoast Transmission Co., Ltd.**, Calgary.

Project: A 36-in. line from Alta. border through Crowsnest Pass to the B. C.-Idaho border at Kingsgate, B. C.

Status: Pending approval of Alberta Oil and Gas Conservation Board.

- **Cartier Gas Corp.** (St. Maurice Gas, Inc., and Consumers' Gas Co., Toronto).

Project: 170 miles from Montreal to Quebec City.

Status: Proposed.

- **Northern Natural Gas Co.**, Omaha.

Project: 73 miles of 20-in. from Savanna Creek to Pincher Creek, Alta.

Status: Planned.

Project: 32 miles of 24-in. from Pincher Creek to Mont. border to tie in with planned U. S. line on to Minneapolis.

Status: Planned.

- **Van Tor Oil & Exploration Co.**, Vancouver, B. C.

Project: Line from B. C. mainland to Vancouver Island.

Status: Proposed.

Completion: 1960.

- **Westcoast Transmission Co., Ltd.**, Calgary.

Project: (See Alberta & Southern Gas Co., Ltd. for joint project).

Foreign Crude Oil Pipelines

- **Arabian American Oil Co.**, Dhahran, Saudi Arabia and N.Y.C.

Project: 9 miles of 32-in. loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1960.

Project: 17 miles of 32-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1961.

Project: 9 miles of 30-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1960.

Project: 12 miles of 30-in. extension of loop from Abqaiq toward Shedgum.

Status: Planned.

Completion: 1961.

Project: 54 miles of 30-in. loop of Safaniya-Ras Tanura line.

Status: Planned.

Project: 63 miles of 30, 32-in. from Khursaniyah to Ras Tanura.

Status: Planned.

Contractor: Company personnel.

Completion: January 1, 1960.

Project: 18 miles of 34, 36-in. from Qatif to Ras Tanura.

Status: Planned.

Contractor: Company personnel.

Completion: July 1, 1962.

Project: 6 miles of 30-in. from Ras Tanura to Ras Tanura terminal; 4 miles of 14-in. from Buqqa to QA-2 pipeline.

Status: Planned.

Contractor: Company personnel.

Completion: October 1, 1960.

- **Assam Oil Co.**, Digboi, Lakhimpur District, Assam, India.

Project: 600 miles of 20-in. from Nahorkatiya field in Upper Assam to Barauni, India, to connect with Burmah Oil Co.'s proposed 250-mile line from Barauni to Calcutta.

Status: Survey of possible routes under way.

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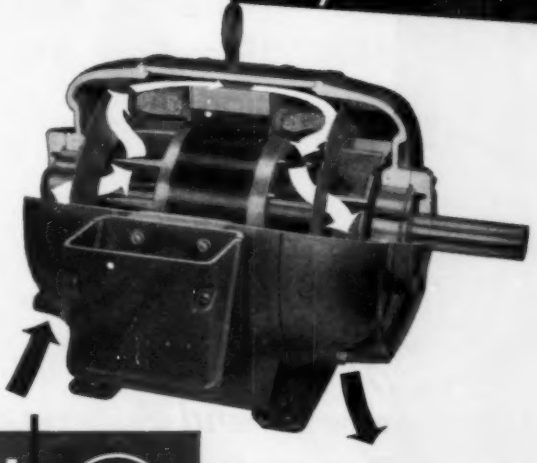

NEW R&M "All Weather 40" OIL COUNTRY MOTORS

R&M "All Weather-40" Motors have a heat rise of only 40°C. with rodent screens installed, compared to 55° for other makes. A leading bearing manufacturer proved grease lasts 52% longer when rise drops from 55° to 40°C. This means less maintenance, longer bearing life, longer service intervals with R&M motors. *Write for Bulletin 589-OG.*

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PIPELINE CONSTRUCTION

Contractor: **Pipe Line Engineering Co.**, Dallas, is making survey.

- **Bolivia-Paraguay.**

Project: 500 miles of 6-in. from Southeast Bolivia to a proposed refinery on Paraguay River, and later to Asuncion.

Status: Planned.

- **British Petroleum, Ltd.**

Project: 60 miles of 18-in. across South Wales, from Milford Haven to the Llandarcy refinery.

Status: Under way.

Completion: Late 1959.

- **Burmah Oil Co., Ltd.**, Glasgow, Scotland.

Project: 250 miles of 20-in. from Barauni to Calcutta, India, extending Assam Oil Co.'s proposed line.

Status: Survey under way.

Contractor: **Collins Construction Co.**, Port Lavaca, Tex., is surveying locations for about 40 river crossings.

- **Cia. Shell de Venezuela.**

Project: 70 miles of 30, 34-in. heated line from Bachaquero to Puerto Miranda, and an unheated 31in. parallel to the section from Cabimas to Puerto Miranda.

Status: Under way.

Contractor: **Williams Brothers Sudamericana, Ltd.**

- **Colon Oil Co.**, Caracas, Venezuela.

Project: 34 miles of 8-in. from El Rosario to Calvario in Venezuela.

Status: Planned.

Completion: February 1959.

- **Colombian Petroleum Co.**

Project: 42 miles of 6-in from Tibu field to Rio de Oro in Colombia, S. A.

Status: Under way.

- **C.R.E.P.S., Societe Nationale de Recherche et d'Exploration des Petroles en Algerie (SN Repal)** and **Cie. Francaise des Petroles Algerie**, Paris, France.

Project: 470 miles of 24-in. from Edjele fields in southeastern Algeria to the Tunisian Mediterranean coast.

Status: Preliminary work under way. Pipe laying to start in 1959.

Contractor: **TRAPSA** (transportation subsidiary of CREPS), with technical assistance and supervision of the project by **Bechtel Mediterranean** (subsidiary of Bechtel Corp., San Francisco).

Completion: September 1960.

- **Elburz Oil Corp.**

Project: 1,000 miles of 38-in. to move Qum crude to the Mediterranean.

Status: Planned.

- **Iranian Oil Participants, Ltd.**

Project: 30 miles of 20-in. and 22 miles of 16-in. looping of Agha Jari to Bandar Mashur line.

Status: Planned.

Project: 50 miles of 26, 28-in. from Gach Saran field to new terminal at Kharg Island in the Persian Gulf.

Status: Under way.

Contractor: A joint venture of **Raymond Concrete Pile Co.** and **Williams Bros. Co.**, Tulsa, **Richard Costain, Ltd.**, and **John Brown, Ltd.**, London, and **Werkspoor & Bredoro,** The Netherlands.

- **Iraq Petroleum Co.**, London.

Project: 600 miles of up to 40-in. from Kirkuk field through Iraq to Turkish port of Iskenderun on the Mediterranean.

Status: Proposed. Survey completed.

Project: 76 miles of 30-in. looping along the Kirkuk-Banias line.

Status: Under way.

Completion: Early 1959.

- **Kuwait Oil Co., Ltd.**, London.

Project: 61 miles of 30-in. from Raudhatain area to Ahmadi.

Status: Under way.

Completion: June 1959.

Project: 4 miles of 38-in. North Pier loading lines.

Status: Under way.

Completion: January 1959.

- **Middle East Pipeline.**

Project: 1,500 miles of 38, 40-in. from Persian Gulf to Mediterranean at Iskenderun, Turkey.

- **Petroleo Brasileiro S. A. (Brazil).**

Project: 40 miles of 12-in. from Catu to Madre de Deus in Bahia.

Status: Under way.

Contractor: **Techint, Inc.**

Project: 80 miles of 24-in. to tie in to proposed Caxias refinery near Rio de Janeiro.

Status: Planned.

- **Rotterdam-Rhine Pipeline Co.** (Caltex Petroleum Maatschappij, Bataafsche Petroleum Maatschappij, Gelsenberg Benzin A. G., and Moiloil A. G.)

Project: 59 miles of 30-in. and 96 miles of 24-in. from Rotterdam to Ruhr industrial area in West Germany to supply refineries at Godorf and Wesseling, and a 25-mile branch to Wessel to serve the refinery in Gelsenkuchen.

Status: Under way.

Contractor: **Bechtel International Co.** is managing the engineering and construction, W. C. Anthony, chief of construction operations, office at The Hague. German and Dutch contractors have 33 miles of 24-in. in south Holland, and 4 major submarine crossings.

Completion: Mid-1960.

- **Royal Dutch-Shell.**

Project: 700-mile line across Europe from the Mediterranean to the North Sea, run-

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A key unit in the reformer is the large, modern debutanizer tower which Graver fabricated on order from Procon Incorporated, the prime contractor. Produced to API-ASME codes and spot X-rayed, the tower is 101′ tall, weighs 138,200 lbs. and is designed to operate at 350°F under 175 psig.

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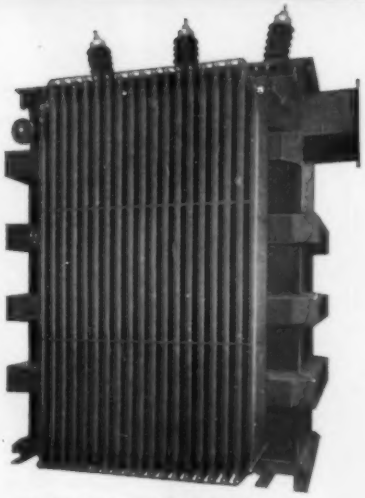
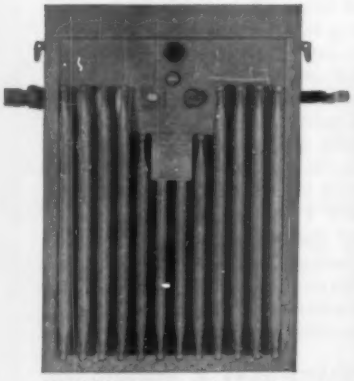


WAGNER INDUSTRIAL POWER TRANSFORMERS

Oil-filled, for outdoor installation, available through 10,000 kva, 67 KV and below. Noflamol filled, for explosive atmospheres, available through 7,500 kva, 15 KV and below.

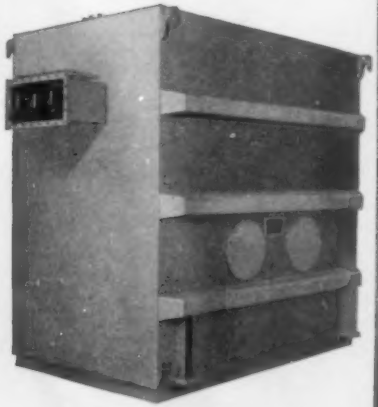
Wagner UNIT SUBSTATION TRANSFORMERS

112½ to 2000 Kva—three phase, 60 cycles, 15 KV and below



NOFLAMOL Non-inflammable liquid-filled. For indoor or outdoor installation, where explosive liquids or gases are present. The close-coupled design illustrated fits flush against switchgear enclosures. Throat connected designs are also available. 55°C rise, self-cooled or forced-air cooled.

OIL-FILLED Generally installed outdoors. Can be used indoors in fireproof vaults. Outdoor transformers can be connected to indoor switchgear using weather-proof bus-duct. 55°C rise, self-cooled or forced-air cooled.



SEALED DRY-TYPE Suitable for indoor or outdoor use, completely fireproof, easy to clean and maintain. Sealed tank is filled with nitrogen under low pressure. Insulated for 150°C rise, self-cooled.

WT58-16A.

PIPELINE CONSTRUCTION

ning through eastern France, Luxembourg, West Germany, Netherlands, and Belgium. Main line to be 30-in.

Status: Considering project as joint venture with several other companies.

- **SOPEG** (construction organization for Cie. Francaise des Petrole (Algerie) and Ste. Nationale de Recherche et d'Exploitation des Petroles en Algerie).

Project: 412 miles of 24-in. from Hassi Messaoud field in the Algerian Desert to Bougie on the Mediterranean Coast.

Status: Under way.

Contractor: **Entrepose Co.** and **Ste. Parisienne pour Industrie Electrique** have 281 miles. **SOCOMAN** and **Eau Assainissement** have 131 miles.

Completion: Late 1959.

- **South European Pipeline Co.** (Jersey Standard, Caltex, and 17 European firms).

Project: 932 miles of 30-in. from Marseilles, France, to Hamburg, Germany.

Status: Proposed.

- **Union of Soviet Socialist Republic.**

Project: 2,315 miles of 28-in. Trans-Siberian crude-products line from Ufa Tuimaza fields in Bashkiria to Irkutsk near Lake Baikal.

Status: Under way.

Project: 600-mile line from Russian fields to Czechoslovakia.

Status: Planned for 1960.

Project: Line from Russian fields to East Germany, possibly as part of a petrochemical expansion program.

Status: Planned.

- **Yacimientos Petroliferos Fiscales (Argentina),** Buenos Aires.

Project: 815 miles of 12-in. from Campo Duran to San Lorenzo.

Status: Under way.

Contractor: **SARGO** (Fish Engineering Corp., Fish Northwest Constructors, Inc., Clark Brothers, North American Utility, Construction International Co.).

Completion: Mid-1960.

Project: 390 miles of 14-in. from fields in Neuquen Province, Argentina, to Bahia Blanca on the coast.

Status: Bids requested.

Project: 625 miles of 12-in. from Mendoza to San Lorenzo.

Status: Planned.

Foreign Products Pipelines

- **National Iranian Oil Co.,** Azna, Iran.

Project: 200 miles of 6 and 8-in. extension of the Trans-Iranian line from Teheran northward to Resht on the Caspian Sea.

Status: Under way.

Contractor: **B. & M. Construction Co.,** Oklahoma City; **Cheney Construction Co.,** Seattle; **Merritt-Chapman & Scott,** New York City.

Completion: April 1959.

- **Union of Soviet Socialist Republic.**

Project: 2,315 miles of 28-in. Trans-Siberian crude-products line from Ufa Tuimaza fields in Bashkiria to Irkutsk near Lake Baikal.

Status: Under way.

- **Yacimientos Petroliferos Fiscales (Argentina),** Buenos Aires.

Project: 652 miles of 10-in. from Lujan de Cuyo to Buenos Aires.

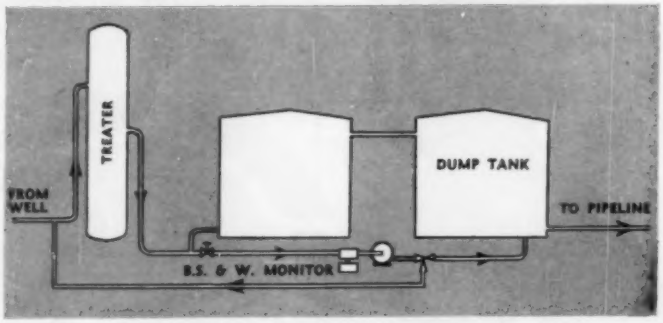
Status: Bids opened August 1958.

Foreign Natural Gas Pipelines

- **Attock Oil Co., Ltd.,** London.

Project: 60 miles of line from Dhulian

HOW TO MEASURE & CONTROL B.S.&W. CONTENT IN CRUDE AT YOUR LACT INSTALLATIONS



INSTALL A B.S.&W. MONITOR

The B.S.&W. MONITOR is the only instrument meeting the specifications for b.s.&w. control as published in the API bulletin on Automatic Custody Transfer.

The MONITOR continuously inspects b.s.&w. content of crude being delivered from the separator and/or treating equipment to tankage or to the pipeline.

If crude exceeds b.s.&w. specifications, the MONITOR will actuate controls to reroute crude to wet storage or to treaters.

A pilot light labeled "Merchantable Oil" is lit as long as contamination does not exceed settings of MONITOR Limit Dial. When it is exceeded, this light goes out, the "Excess B.S.&W." light goes on and the "Time-Delay" relay is actuated. If delivery of contaminated oil continues longer than Time-Delay setting, the relay actuates to reroute bad oil. A light labeled "Oil By-Passing" remains lit as long as crude is rerouted. When the stream returns to acceptable b.s.&w. content, it is diverted back to line or storage, AUTOMATICALLY.

Percent of crude contamination can be taken at any time.

SPECIFICATIONS: Range — From standard 0-3% b.s.&w. to 0-25%
Sensitivity — .05 water contamination
Accuracy — 0.1 of 1% water contamination
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75 pounds in a single stage.

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PIPELINE CONSTRUCTION

field to Rawalpindi in West Pakistan.
Status: Planned.

• **Cia. Shell de Venezuela.**
Project: 9 miles of 16-in. from near Cardon to Amuay, extending its Pagline system.
Status: Under way.
Completion: Early 1959.

• **Cuban Gas Transmission Co.**
Project: 500-mile line from Campeche area of Mexico across Yucatan and a 150-mile line on the ocean floor to Havana.
Status: Under study by **Ebasco Services.**

• **Gaz de France.**
Project: 550 miles of 16 to 24-in. from Lacq field in southwestern France to Paris, plus 12 to 16-in. laterals to Lyons, making a 1,000-mile system.
Status: Under way.
Contractor: French contractors.
Completion: Line to Lyons to be completed March 1959; line to Paris in 1960.

• **Japan Gas Chemical Industries.**
Project: 10 miles of 10-in. from its company-owned fields to plants in Niigata, Japan.
Status: Under way.
Completion: Spring 1959.

• **Petroleos Mexicanos,** Mexico D. F.
Project: 130 miles of 22-in. to parallel a 14-in. line from Reynosa to Monterrey.
Project: 490 miles of 24-in. artery from Jose Colomo field in the State of Tabasco to Mexico City.
Status: Preliminary work under way.
Completion: March 1960.

• **Sui Gas Transmission Co.,** Multan, Punjab, India.
Project: 130-mile extension of the new 310-mile, 16-in. Multan-to-Sui, Pakistan line. Extension will terminate at Lyallpur.
Status: Planned.

• **Union of Soviet Socialist Republic.**
Project: A 465-mile line from Karadag near Baku to Tbilisi and Erevan.
Status: Under way.
Completion: 1960.

Project: A 127-mile line across the Turkmenian Desert from Kizyl-Kum to the Caspian Sea port of Krasnovodsk.
Status: Under way.

Project: Two parallel lines, each over 1,200 miles long, from Gazly, near Bukhara, northward to Sverdlovsk and Chelyabinsk.

Status: Proposed.

Project: Line from near Bukhara, through Tashkent to Chimkent, Dzhambul, Frunze, and Alma-Ata near the border.

Status: Proposed.

Project: Line from Sverdlovsk to Omsk, Kemerovo and Tomsk.

Status: Proposed.

Project: Line from Berezovo field to Sverdlovsk.

Status: Proposed.

Project: Line from Stalingrad to Gorky and to Moscow.

Status: Proposed.

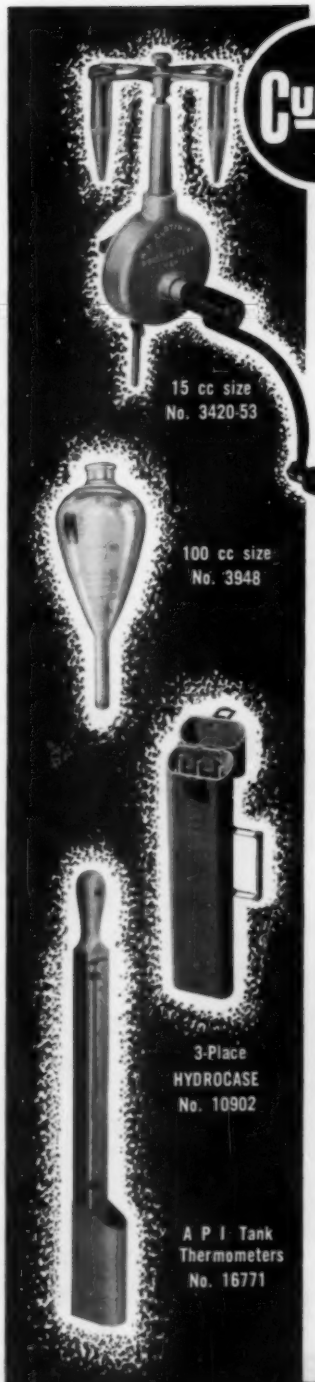
Project: Line from Dzhebol field to Izhevsk and to Sverdlovsk.

Status: Proposed.

Project: Line from Gorky to Kazan.

Status: Under way.

Project: Line from Saratov to Sverdlovsk,



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PIPELINE CONSTRUCTION

with branches into Stepanovskoe field.

Status: Proposed.

Project: Line from Kanevskoe (Kransnodar) field to Sulkhumi.

Status: Proposed.

Project: Line from Shebelinka field to Rostov, to Odessa, and northward to connect with proposed line from Lvov to Leningrad.

Status: Proposed.

Project: Line from Riga to proposed line from Lvov to Leningrad.

Status: Proposed.

Project: Line from Rostov to Moscow.

Status: Proposed.

Project: Line from Severo-Stavropolskoe (North Stavopol) field to Moscow.

Status: Under way.

Project: Line from Leningrad to Moscow.

Status: Under way.

• **Yacimientos Petroliferos Fiscales (Argentina),** Buenos Aires.

Project: 1,015 miles of 24-in. from Camp Duran to Buenos Aires.

Status: Under way.

Contractor: **SARGO** (Fish Engineering Corp., Fish Northwest Constructors, Inc., Clark Brothers, North American Utility, Construction International Co.).

Completion: August 1960.

Project: Line from Comodoro Rivadavia to Buenos Aires with a spur to Plaza Huincul field in Neuquen province. Line will be 26-in. to the connecting point for the Plaza Huincul link and 30-in. from the connection to Buenos Aires.

Status: Proposed.

FOR PROJECTS OUTSIDE U.S.A...

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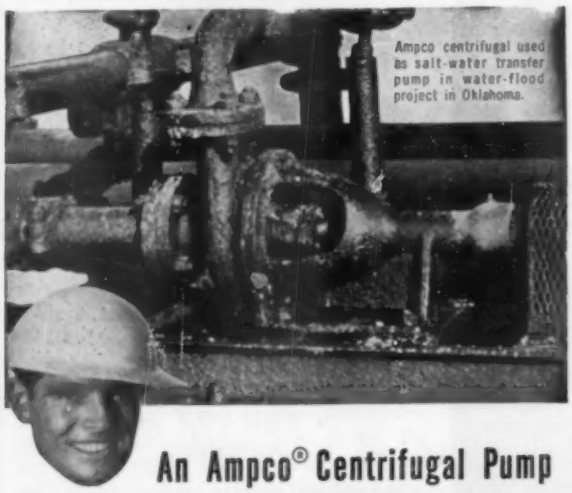

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WRITE FOR BULLETIN P-3B

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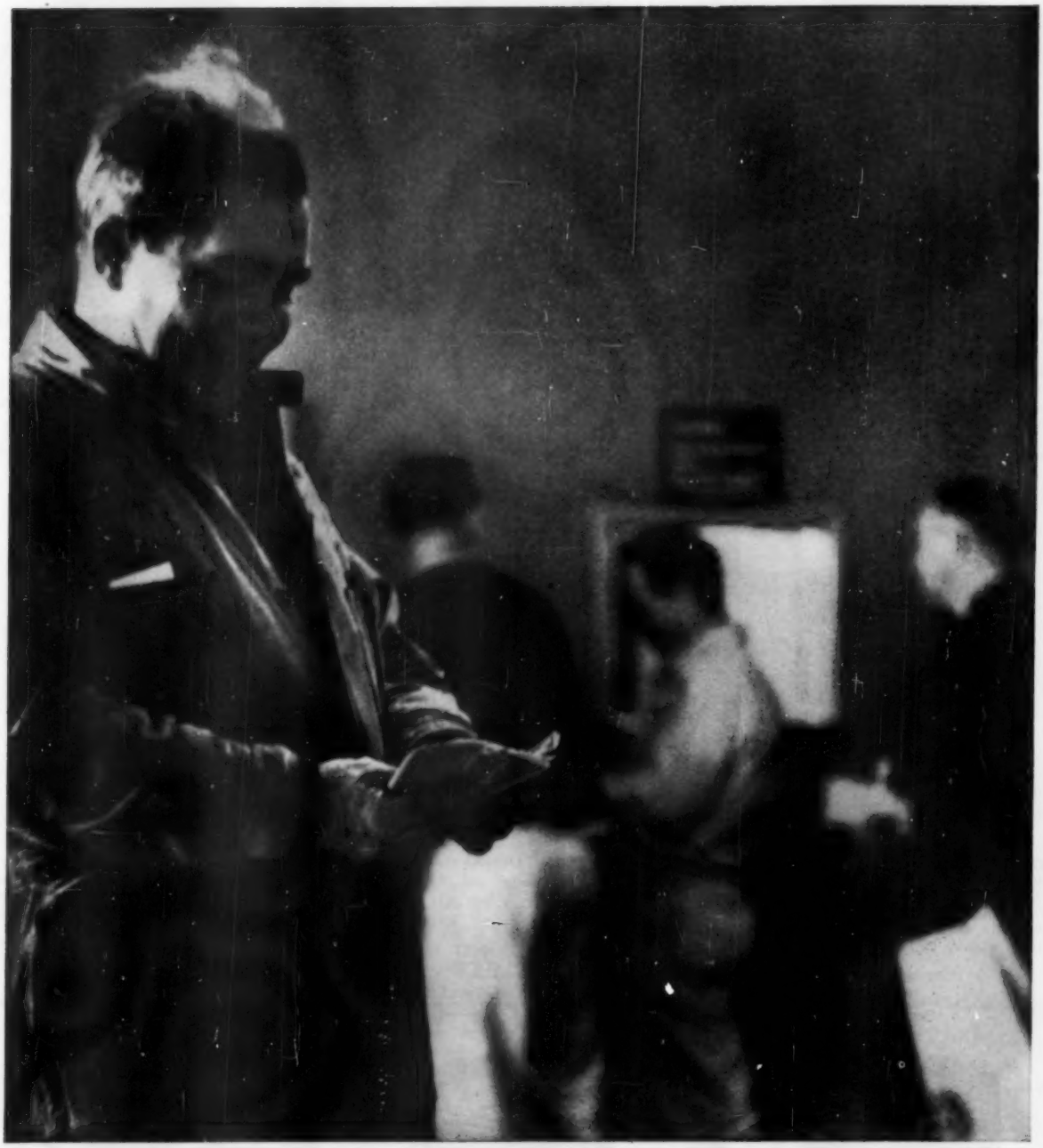

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—Eugene Holman, Chairman of the Board, Standard Oil Company (New Jersey)

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This week's SHOWCASE features . . .

Straddle crane may ease pipe laying

. . . as it is adapted for lifting loads weighing up to 25 tons and for straddling ditches. It will travel at speeds to 10 m.p.h. forward or reverse. Called the Silent Hoist Strad-Krane, the machine always maintains the center of the load inside of the wheel supports.

The load is suspended from a hook under the frame. The hook can be spotted directly over the load and is controlled by a trolley bridge hoist atop the machine. The hook can travel from one end of the machine to the other and up and down.

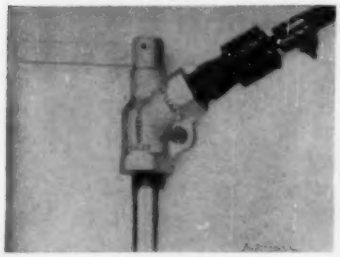
The crane is self-propelled on pneumatic tires. Operation is made easy through the use of a six-cylinder engine equipped with a directional power-shift automatic transmission. **Write or call: Silent Hoist & Crane Co., Dept. 80, 841 Sixty-Third Street, Brooklyn 20, N. Y., for details on Strad-Krane.**

New packing, gasket material

. . . called Viton is used in a line of packings, gaskets, and seals now available. The material is a broad temperature-range polymer which has been developed in basic formulations with durometer hardness of 60 to 90.

The material gives high resistance to deterioration from heat, oils, solvents, and many corrosive liquids. According to the maker, Viton will give good performance when exposed to dry heat, retaining its useful elasticity for more than 1,000 hours at 450° F. **Write or call: Garlock Packing Co., Palmyra, N. Y., for details on Vitron packing and gaskets.**

●



Quick-opening air-service valve

. . . obtains positive shutoff with a spring-loaded rubber plug. It has no wearing parts which minimize maintenance. Handle position indicates whether the valve is open or closed.

Called a Universal stopple valve, it has an automatic bleed to prevent accidents due to disconnecting of the tool hose under pressure.

In a closed position, the valve plug

Recorder checks depths to 300 ft.

. . . and is accurate to 2%. It is made with five ranges of 60 ft. each. Weighing only 43 lb., the Model DR-17 recorder is expected to prove valuable to surveying and exploration groups.

Portable and fitted with carrying handles, the case is watertight and contains the transducer, sections of stainless-steel tubing to support the transducer in the water, and battery cable.

The recorder can be operated by a 6-volt battery and draws only about 9 amp. Total weight of the recorder and case that houses the transducer, connecting cable, and sectional tube for immersion of the transducer is only 66 lb. Over-all measurements are 15⅝ by 16⅛ by 9½ in. **Write or call: Bendix Marine, 8211 Lankershim Boulevard, North Hollywood, Calif., for details on Model Dr-17 depth recorder.**

Send this **Showcase Coupon**

to the **Manufacturer** of the item in which you are interested. See name, address, and equipment name and/or model, in bold-face type at end of description.

NAME AND/OR MODEL NUMBER.....

.....

Described in OIL AND GAS **JOURNAL** - Issue of **Dec. 29, 1958**

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

is held in place by line pressure and spring load. Also, the valve handle is down and the hollow stem provides an automatic bleed of the tool hose to the atmosphere. When the handle is raised to an upright position, the stem pushes the plug off its seat and allows full flow through the valve. When open, the hollow stem is pressed against the rubber to prevent bleedout.

The valve is made with a cadmium-plated steel body. The inlet size may be either ¾ or 1-in. NPT. The outlet size is ¾ in. NPT. **Write or call: Rutherford Co., Inc., P. O. Box 19364, Houston, for details on Universal Stopple valve.**

TV accessory magnifies image

. . . four times. The Magniport unit is designed for use with closed-circuit TV systems used for remote reading of boiler-drum water-level gages. It is prewired and comes with lamps installed ready to mount directly to Diamond 15-in. multiport water-level gages. Power is used only to provide front illumination of the magnifying ports. No additional front illumination is needed.

Weighing about 20 lb., the unit can be installed with a screwdriver and end wrench. **Write or call: Electronics Div., Diamond Power Specialty Corp., Box 415, Lancaster, Ohio, for details on Magniport unit.**

●

Chromatograph gives continuous trend

. . . trace of component concentration. The pneumatic trend-recording gas chromatograph has a new readout system that permits continuous checking of components of interest. And it permits regulation of process operations by cascade control through chromatography.

Several pneumatic miniature recorders present analysis data. Part of the recorders are two-pen units that trace trend concentrations of two components. Another recorder traces a chromatograph of the analysis for use in calibrating and adjusting the instrument. A curve is provided for each component. This allows measuring a critical component for use as a control point in the operation. **Write or call: Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, Calif., for details on pneumatic trend-recording chromatograph.**

●

Packaged boiler generates 100,000 lb.

. . . of steam an hour. Employing natural circulation, the packaged unit is expected to prove useful in refineries and petrochemical plants. The Series 100-OG unit is expected to cost about 20% less than units of similar capacities which must be field-tested.

Reduction in total cost has been achieved in part by the use of natural circulation. This method eliminates

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All over the world Triangle Valves *prove* their superiority . . . gain top marks in the test of time. Their outstanding record for long trouble-free service is well known. Equally famous are the new revolutionary advances in valve design . . . providing brilliant solutions to scores of flow-control problems; contributing to greater efficiency and smoother operation in major industries throughout the world today.

The new Triangle Line Blind Valve—latest addition to a range of the most advanced valve designs available—eliminates the necessity to spread lines when changing over, and dispenses with the need for special tools when closing the blind—does the job in one simple time-saving operation.

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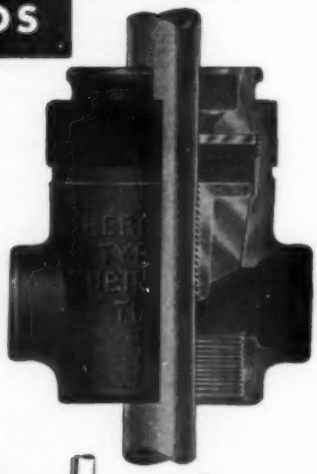
HERCULES TUBING HEADS

"TYPE J-5" TUBING HEAD

Ideal for flowing or pumping wells or for well servicing and repressuring projects. Will suspend 2" tubing to 5½" casing up to maximum of 180,000 pounds. Head is full-opening; constructed of pressure cast steel tested to over 4,000 psi. HERCULES original overhead packing arrangement and hinged slips facilitate installation and servicing. HERCULES Neoprene Tubing Stripper (2" - 2½" - 3") may be used in this head on wells flowing intermittently or to wipe tubing. Equipped with safety threads.

"TYPE J-5-S" STRIPPER TUBING HEAD

The dual purpose "Type J-5-S" Stripper Tubing Head is basically a "Type J-5" Tubing Head with a bowl (top section) screwed into the packing nut thread. The hinged slips, packing and packing nut are installed in the bowl (top section) with the tubing stripper in the body (lower section), thus permitting tubing to be run-in or removed under pressure. Test pressure is the same as the "Type J-5" Tubing Head.



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Specify **"GOTKOOL"** the next time you order water cans or coolers. **"GOTKOOL'S"** exclusive construction keeps water cooler... fresher... purer. Extra wide, snug-fitting, splash-proof top keeps out impurities. Non-leaking, push-button faucets, either extended or recessed flush-mounted. *Buy* **"GOTKOOL"** *at your supply store today.*

GOTKOOL Water Cooler – made in 1½-, 2-, 3-, 5-, 10-, 15-, and 20-gallon sizes with either extended or recessed, flush-mounted faucet.*

GOTKOOL Water Can – made in 1½-, 2-, 3-, 5-, 10-, 15-, and 20-gallon sizes without faucet.

Insist on the genuine – look for the Blue and Black Label with the name "GOTKOOL" in Red.

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SHOWCASE . . .

New Equipment

need for recirculating pumps and simplifies operation and maintenance. The entire furnace and boiler envelope is water-cooled.

The boiler is designed to operate at steam pressures from 250 to 775 psi. Pressure fired, it will burn either oil or gas or a combination of the two. Boiler-steam pressure can be raised quickly and safely, the maker reports. The unit has a drainable superheater which is cooled and protected with steam as soon as drum pressure is raised. **Write or call: Babcock & Wilcox Co., 161 East Forty-Second Street, New York, for details on Series 100-OG boiler.**

●

Miniature temperature-sensitive relay

. . . may be the answer for obtaining temperature-depth information during drilling operations. The NEC 200 Series relay is designed with varying temperature sensitivity from 120° to 600° F. Several relays can be attached in clusters above the drill bit to give the drill-bit temperature as a protection against overheating.

A temperature-indicating pellet is used in the relay. The pellet changes from a solid to a liquid at a specified temperature. Both the pellet and the relay mechanism are hermetically sealed by bonding metal headers to a high thermal and shock-resistant glass housing.

Current ratings for the relay range from 4 to 50 amp. Dimensions range from ¼-in. o.d. by 1 in. long to ⅝-in. o.d. by 1¼ in. long. **Write or call: Networks Electronic Corp., 14806 Oxnard Street, Van Nuys, Calif., for details on NEC 2000 Series relay.**

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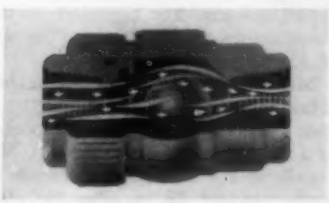
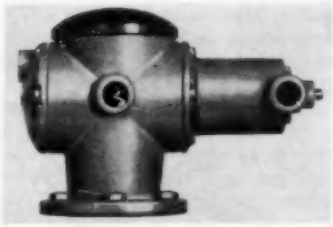


Plastic check valve has two seats

. . . for high and low pressure. The low-pressure seal is established on less than an ounce of pressure difference and unseats at the same pressure level. The high-pressure seal is established as pressure increases and finally creates a solid seat which seals against flow and pressure to the ultimate strength of the valve. Yet the high-pressure seal will unseat at a low pressure difference.

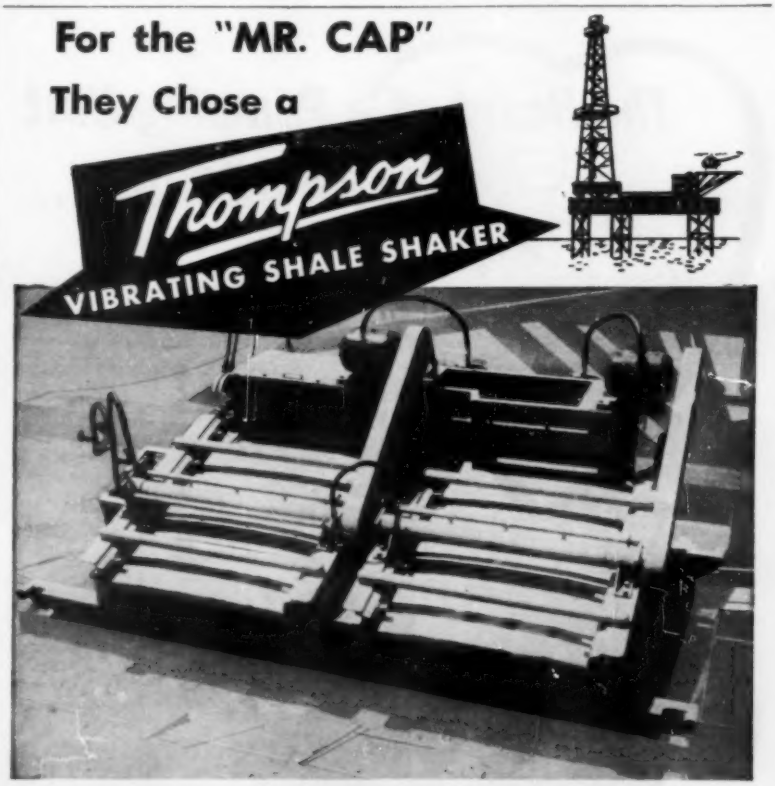
The valve comes in several types of plastic. It operates in any position. End connections can be threaded, socket-weld, flanged, or grooved. Available sizes are ½ through 2 in. **Write or call: Chemtrol Co., Lynwood, Calif., for details on plastic check valve.**



Valve positioner acts fast

. . . to match or exceed the speed of pneumatic controllers. The Model J unit is a top-mounted integral positioner using a force-balance design. This design is combined with a pilot-

For the "MR. CAP"
They Chose a
Thompson
VIBRATING SHALE SHAKER



Thompson . . . Perfect for Offshore Work!

On offshore rigs the reclamation of mud is vitally important and the separation of shale and abrasives from drilling muds means a more effective, time and money saving drilling job. Barnwell Offshore, Inc. chose Thompson for their new offshore rig, the VINEGARROON, because it was field proven, will give them clean mud and make tools last longer, with a minimum of re-tooling and restoration of mud solution.

A Thompson Separator is your surest bet onshore . . . offshore . . . for shallow, medium and deep wells. The dependable Sample Machine works simultaneously with the separator, giving a foot-by-foot mud analysis with specimens. Write for Folder.

THOMPSON TOOL CO.
IOWA PARK, TEXAS
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operated relay valve to obtain a high power output and sensitivity.

Suitable for use on both cylinder and diaphragm-type actuators, the positioner is capable of an infinite number of stroke lengths up to 8 in. It responds to signal changes as low as 0.001 psi. and is unaffected by vibration.

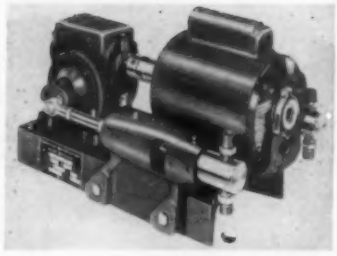
The positioner is completely enclosed and weatherproof and suitable for use in adverse weather and plant atmospheres. An anodized-aluminum housing protects all moving parts. **Write or call: Conoflow Corp., 2100 Arch Street, Philadelphia 3, for Bulletin J-1.**

Proportioning pump accuracy ±1%

. . . when the pump operates between 10 and 100% of stroke length. The controlled-capacity pump has an adjustable stroke length ranging from 0 to 1½ in. Capacity regulation is easy and accurate. The stroke is adjusted by a screw on the crank while the pump is stopped.

The Series 100 pump comes in both simplex and duplex models with simplex capacities from 0.65 to 13.10 gal. an hour. Duplex pump capacity is twice that for a simplex pump.

Features of the pump include spher-



ical bearings on both the crank and plunger ends of the connecting rod. A nylon dust cover protects the bearings from dirt and dust.

Ball-check type of valves are used. They have replaceable seats. Liquid ends are obtainable in carbon, Types 303 and 316 stainless, and Carpenter 20 steel and a Hastalloy B, C, and D. **Write or call: American Meter Co., Pump Div., 1523 Race Street, Philadelphia, for details on Series 100 proportioning pumps.**

•

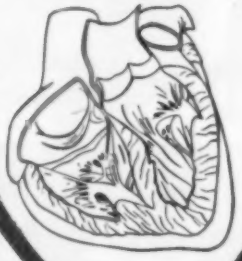
Expanding anchors for oil-field use

. . . are made with a spreader block dovetailed into the wings so the wings will be locked to the spreader at all times. If the anchor wings are not expanded during installation, they will expand and lock when a load is applied.

The anchor has three heavy wings of equal size and strength. These prevent the anchor from twisting or turning sidewise and cutting its way out of the soil. The curvature of the wings causes a cone effect on the soil of 35° to 45°.

Made of malleable iron, the anchor comes in three sizes. The No. 201 anchor installs in a 6-in. hole and spreads to a diameter of 16 in. The No. 301 installs in a 9-in. hole and spreads to a diameter of 21 in. The No. 101 anchor installs in a 10-in. hole and spreads to a diameter of 26 in. **Write or call: Grip-Tite Mfg. Co., P. O. Box 111, Winterset, Iowa, for details on oil-field anchors.**

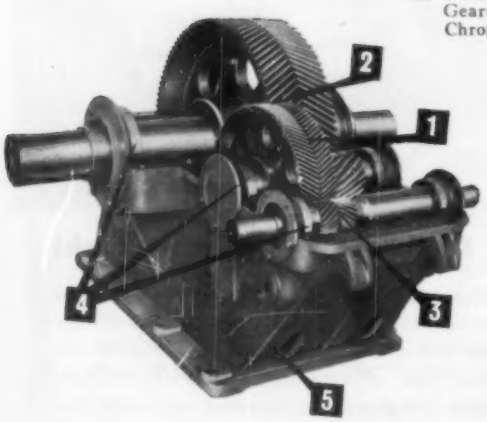
The Heart of a Pumping Unit is its GEARBOX...



. . . a tough, hardworking body must have a sound heart . . . This is why Le Grand gives top priority to sound material and accurate workmanship.

Five of the features that make them so trouble-free are:—

1. Manufactured to A.P.I. Specification in full range from A.P.I. Size 10 to A.P.I. Size 640.
2. Double-Helical, Double-Reduction Gears made from Nickel-Chrome and Chrome-Moly Alloy Steel: 30:1 Ratio.
3. First Reduction Gear Train—Single Wheel and Pinion on smaller sizes; Split on Sizes 320 and larger. Conforms to standard practice.
4. Bearings all Location Type, Heavy-Duty Roller or Ball.
5. Sloping inside base controls oil capacity and stiffens case.



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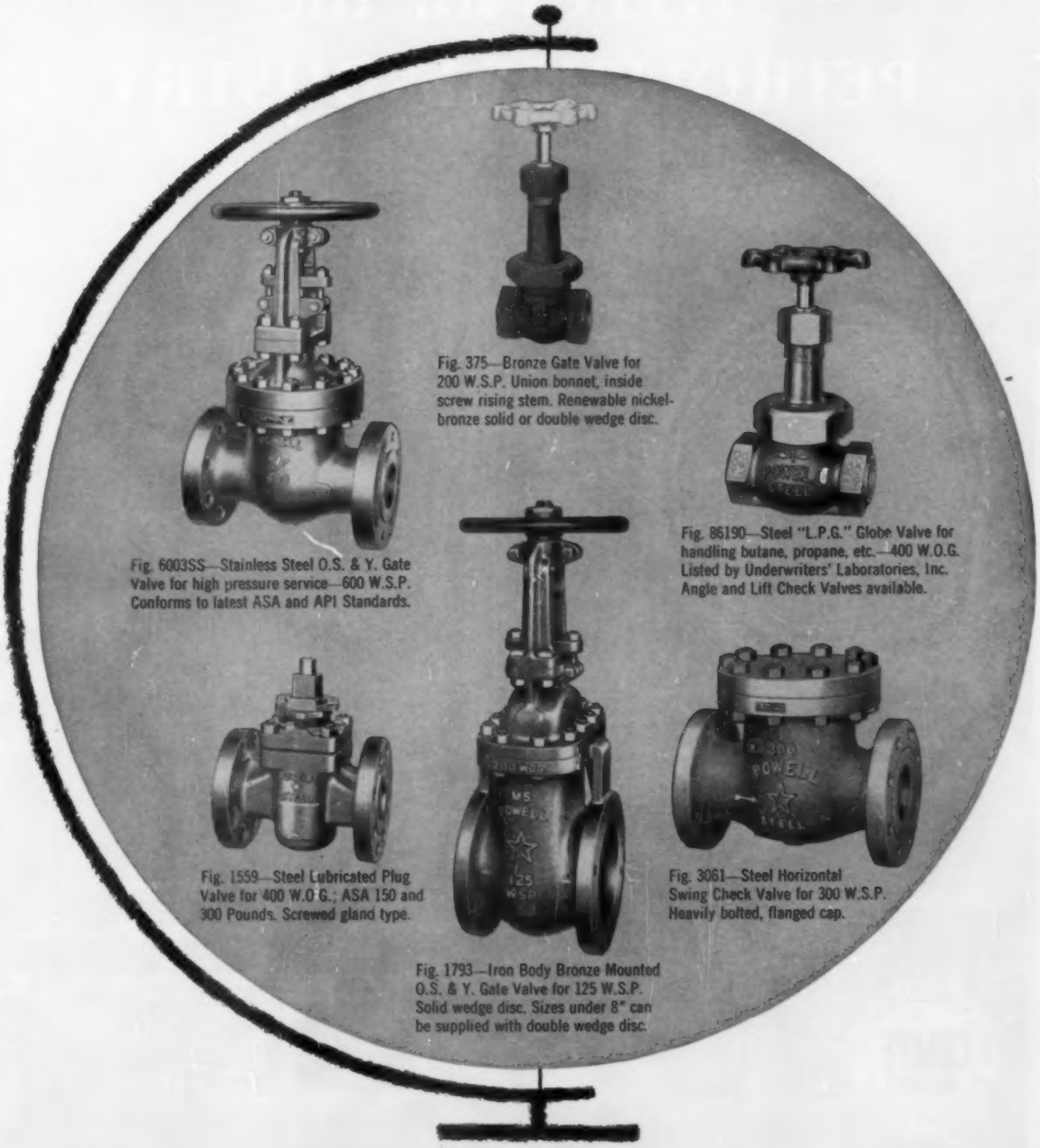

Fig. 375—Bronze Gate Valve for 200 W.S.P. Union bonnet, inside screw rising stem. Renewable nickel-bronze solid or double wedge disc.

Fig. 6003SS—Stainless Steel O.S. & Y. Gate Valve for high pressure service—600 W.S.P. Conforms to latest ASA and API Standards.

Fig. 86190—Steel "L.P.G." Globe Valve for handling butane, propane, etc.—400 W.O.G. Listed by Underwriters' Laboratories, Inc. Angle and Lift Check Valves available.

Fig. 1559—Steel Lubricated Plug Valve for 400 W.O.G.; ASA 150 and 300 Pounds. Screwed gland type.

Fig. 1793—Iron Body Bronze Mounted O.S. & Y. Gate Valve for 125 W.S.P. Solid wedge disc. Sizes under 8" can be supplied with double wedge disc.

Fig. 3061—Steel Horizontal Swing Check Valve for 300 W.S.P. Heavily bolted, flanged cap.

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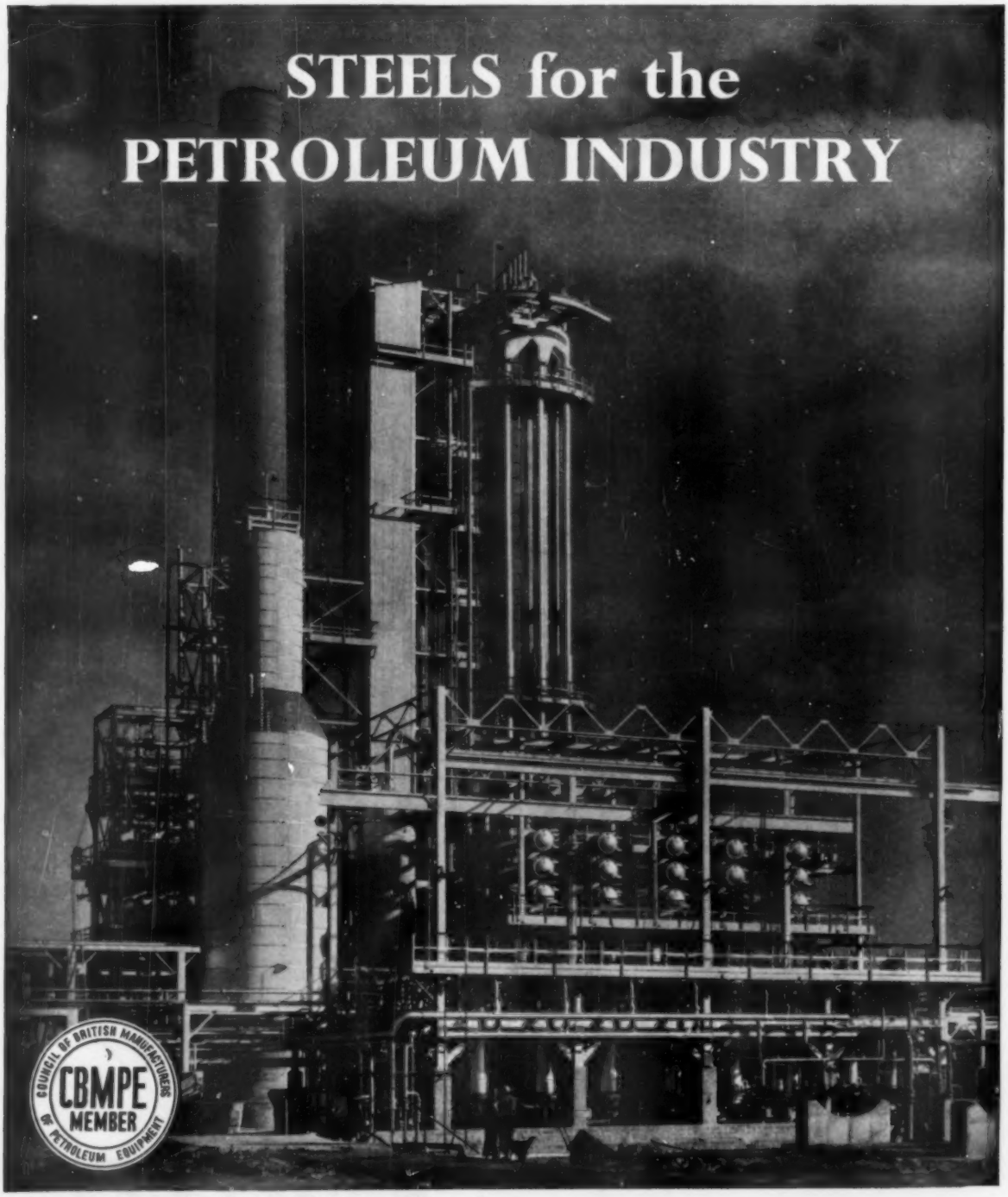

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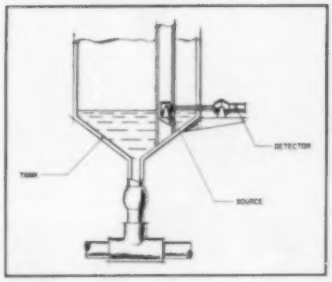
SHOWCASE . . .

New Equipment



Gage tells if liquid is present

. . . or absent at a preset level. Sensitive to changes of level as small as a few thousandths of an inch, the Model 40105 gage can be coupled with automatic controls to operate valves and drains and keep the liquid at a desired level.

A scintillation detector outside a tank detects and records the radioactivity strength of a source which is on a horizontal plane with the detector at the desired level. The source may be inside or outside of the tank. Changes in radiation strength indicate presence or absence of liquid at the desired level. **Write or call: Radiation Counter Laboratories, Inc., 5121 West Grove, Skokie, Ill., for details on Model 40105 gage.**

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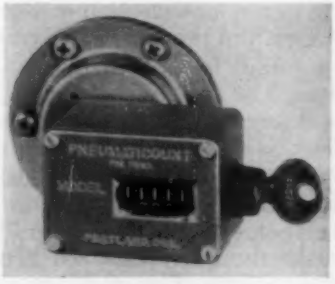


Automatic counter for oil-field

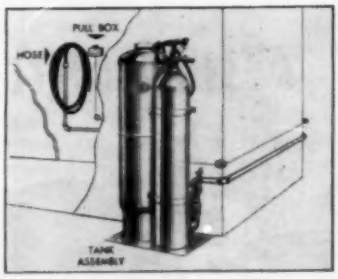
. . . equipment is especially adaptable as a metering device for automatic custody units. Controlled by pneumatic action, the counter can be installed in the line controlling an air cylinder. It has no linkage to assemble or to get out of adjustment.

It has a tamperproof key reset and a weatherproof case. Models are available for pressures from 1 to 5,000 psi. and up to 300 counts a minute. They may have either five or six digits. The numerals are 0.166 in. high and white on black. **Write or call: Pneumaticount, 3400 North East Fifty-Fourth Avenue, Portland, Ore., for details on Pneumaticounts.**

Dry-chemical fire extinguisher

. . . system permits remote control from a distant hose-site pull box. A pull handle at the hose site simultaneously opens a valve, pressurizes the tank, and fills the system with chemical powder.

The system is made with capacities of 150 through 300 lb. of dry chemical. Dry-chemical-powder fire extinguishers are particularly suited for the protection of flammable liquids and electrical equipment. The packaged system is expected to prove useful in refineries and at drilling rigs.



Write or call: Fyr-Fyter Co., 221 Crane Street, Dayton 3, Ohio, for details on stationary dry-chemical system.

NEW...Two Money Saving Instruments

for the Refinery or Petrochemical Plant

AUTOMATIC END POINT RECORDER

- Monitor Ends Points . . .
- To get maximum yields of desired fractions
- To cut waste at start-up
- To protect catalytic reformers from high end point feed stock
- Quick . . . Cycle complete in 20 minutes
- Range, 225 to 675°F

CONTINUOUS FLASH POINT RECORDER

- Monitor Flash Points . . .
- To get maximum yields of desired fractions
- To cut waste at start-up
- To protect any stream, pipe line, loading point from off specification product
- Automatic—repeats continuously, recording flash point at 3 minute intervals. Range 80 to 190°F

• Write for Bulletin 703 (End Point) or 702 (Flash Point)

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- CORROSION RESISTANT
- FORCED AIR COOLED

All these features of Fieldmaster Ball Bearing Motors have been designed to overcome the rugged conditions of Oil Field requirements.

FIELDMASTER

CHECK THESE OUTSTANDING ADVANTAGES.

Heavy Cast base for alignment, stability, heavy duty, double-shielded, prelubricated bearings, reduces lubrication worries, high grade silicon steel in the magnetic circuit reduces iron losses . . . Wide variety of windings provides triple ratings, dual voltages . . . high torque licks heavy starting problems. High slip is available to take care of reciprocating load requirements encountered in pumping.

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BETHLEHEM SUPPLY CO. TULSA, OKLAHOMA

Manufactured by VALLEY ELECTRIC CORPORATION, St. Louis, 8, Mo.

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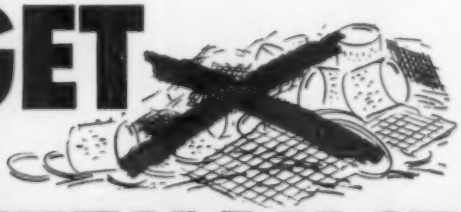

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If you have been using scrubbers, separators, mist extractors or purifiers that have troublesome filters and screens—*then Hi•eF Purifiers are for you!* These compact, high-performance units operate on a revolutionary turbo-action separation principle. They have no filters or screens that clog up and lower separating efficiency. All maintenance is completely eliminated. For engineering assistance in adapting Hi•eF Purifiers to your present problem, write for Purifier Bulletin No. 600,

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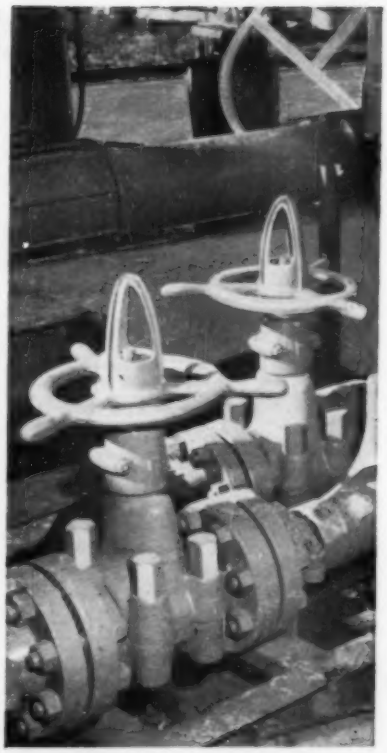
See the Refinery Catalog

One Complete Dependable Source for Purifiers • Scrubbers • Separators • Mist Extractors



WHERE IS THIS MUD VALVE?

This Cameron Type "R" Flex-Seal Mud Valve is on a drilling rig in a remote section of North Africa. But the same valve could be found in any oil producing area. The rugged dependability and sound economy of Cameron Flex-Seals have made them the favorite of the drilling industry for over twenty years. Design refinements in the Type "R" make the Flex-Seal even better than before. The over-size gate packing is tougher — wear rings are larger and the valves stay rigid in the line during repairs. Check any rig anywhere. You will see why smart operators COUNT ON CAMERON Flex-Seal Mud Valves. Flex-Seals are manufactured in the United States, England and France.

Cameron
IRON WORKS, Inc.
P. O. Box 1212-Houston, Texas
Export Office: 7912 Empire State Bldg., New York City. In England: Cameron Iron Works Ltd., 76 Grosvenor St., London W. 1, England

SHOWCASE . . .

New Literature

Oil-handling equipment

. . . is covered in detail in new 50-page Catalog 700, following eight months of preparation. The catalog gives you data on spring-balanced and counterbalanced loading assemblies, swing joints, loading-line valves, part replacements, truck and tank-car loading equipment, dip pipes, ball joints, accessories, engineering data, pressure-drop charts, and conversion tables. Sizes, dimensions, and construction details accompany the items as do pictures and drawings. One section can be particularly helpful as it illustrates and describes 50 swing-joint variations. **Write or call: Oil Equipment Mfg. Co., Inc., 3100 Vermont Avenue, Louisville 11, for Catalog 700.**

Controlled-volume pumps

. . . with totally enclosed drives are outlined in new Bulletin 258 which tells how the pumps work, describes design features, and gives specifications. The pumps are designed to provide highly accurate metering of chemicals against pressures up to 1,900 psi. in adverse atmospheres. Pump capacity can be adjusted in a direct linear relationship while the pump is running, according to the bulletin. It points out that a minimum of working parts and bearing surfaces are used to translate the rotary action of a standard high-speed electric motor to the low-speed reciprocating pump motor. **Write or call: Milton Roy Co., 1300 East Mermaid Lane, Philadelphia 18, for Bulletin 258.**

Oil-testing kit

. . . determines the presence of damaging contaminants in oil as described in a new four-page bulletin. The bulletin explains how the kit enables even nontechnical people to test oil in a fast, easy, and inexpensive manner. Three major discussions are included: (1) how do excessive solids in your oil damage your engine? (2) how does excessive fuel dilution of your oil damage your engine? and (3) how do corrosive acids in your oil damage your engine? **Write or call: Lengor, Townsworth Building, Annapolis, Md., for Simplex Oil-Testing Kit bulletin.**

Pipeline aftercoolers

. . . are described in new eight-page Bulletin 302.6K1. The bulletin illustrates steel-shell construction, removable corrosion-resistant tube bundle, countercurrent flow design, and an advanced centrifugal moisture separator. The fully standardized parts are said to eliminate big engineering costs and long delays involved in custom fabrication. Specifications give details on 54 models with capacities designated for operating pressures up to 125 psig. for single two-stage compression. **Write or call: Ross Heat Exchanger division of American Standard, P. O. Box 2081, Buffalo 5, N. Y., for Bulletin 302.6K1.**

Steel-drum specifications

. . . and drawings of standard 55-gal., open and closed-head drums are detailed in a new bulletin. The bulletin also describes a new process for cleaning and phosphating drums to inhibit rust and corrosion. The process is also said to provide better paint and lining adhesion. **Write or call: Bennett Industries, Inc., Lincoln & Washington Streets, Peotone, Ill., for Steel-Drum bulletin.**

Efficient altitude valve

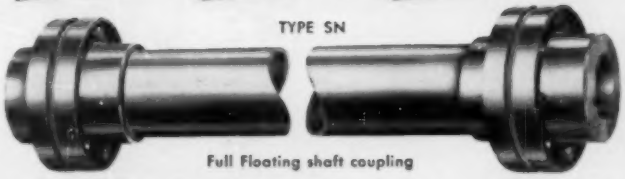
. . . made from a butterfly valve and an altitude-valve controller is shown in new two-page Bulletin Reference 650.20A-1. It includes explanatory text, installation drawings for single and double-acting altitude control, and a drawing of the hydraulic altitude-valve controller. The bulletin lists

Protect Your Machinery with

THOMAS FLEXIBLE COUPLINGS

ALL METAL

NO LUBRICATION · NO MAINTENANCE · NO WEARING PARTS



Full Floating shaft coupling

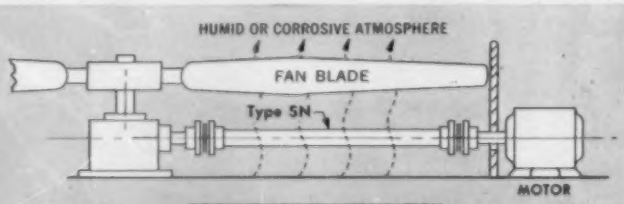
REFINERS! PIPE LINE MEN! DRILLING ENGINEERS! LABORATORY TECHNICIANS!

Thomas Couplings are used to advantage on Pumps, Compressors, Cooling Towers, Rigs or any other tough job where continuous operation and dependability are required.

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

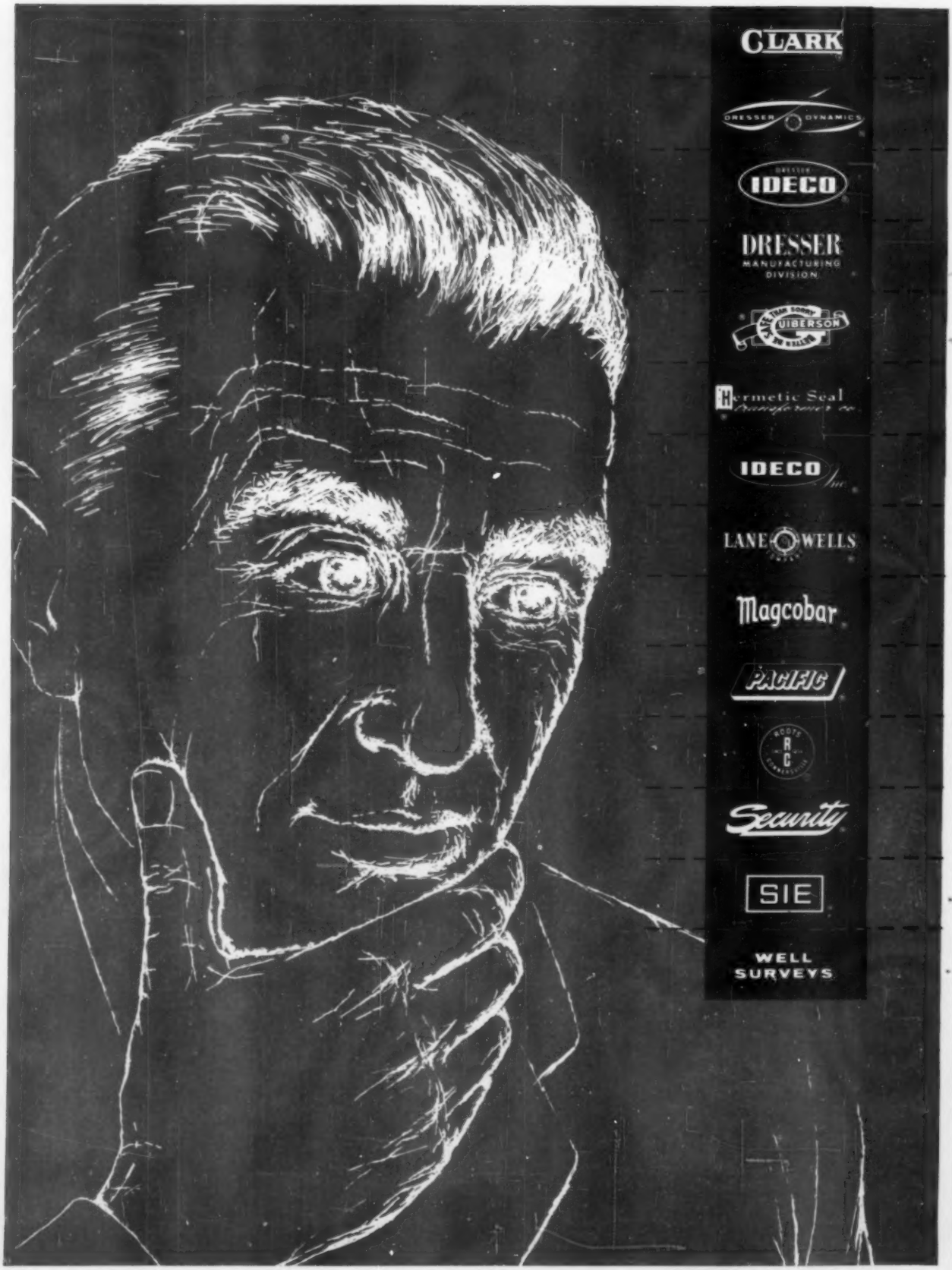


COOLING TOWER INSTALLATION

In the typical cooling tower installation shown above, the motor — outside the humid or corrosive atmosphere — is connected by a floating-shaft coupling to the gear box under the large slow-speed, horizontal-blade fan.

Write for engineering catalog 51A, and the name of your nearest Thomas representative

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.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steel structures, radar towers

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couplings, fittings and rings

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oil tools, molded rubber products

HERMETIC SEAL TRANSFORMER CO.
electronic transformer development

IDECO, INC.
drilling rigs, missile hoist

LANE-WELLS COMPANY
technical oilfield services

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drilling muds, chemicals

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blowers, meters, vacuum pumps

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electronic instrumentation, computer systems

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HOW MANY COMPANIES COME TO MIND WHEN YOU THINK OF DRESSER INDUSTRIES?

If you're engaged in the oil, gas, chemical processing or electronic industries, you likely know one or more of these Dresser companies. Though each operates independently in its specialized field of manufacturing, service or research, all are teamed together to provide an important *extra*. This is the Dresser *plus* ... an international symbol of coordinated industrial performance. The inter-company teamwork of all Dresser companies makes available to the customers of any one, the global experience, manufacturing facilities, research and engineering services of all. Wherever you are, whatever your needs, look to your Dresser local representative for equipment and technical services which have become the standard of comparison throughout the world.

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BY MEN WITH IMAGINATION

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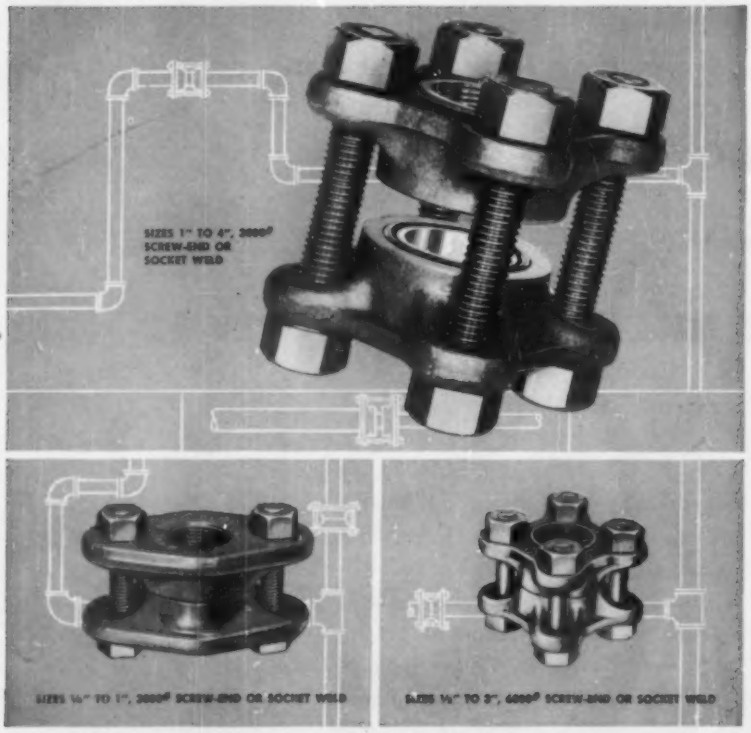
The double diamond assures double value



Installation flexibility with permanent piping strength

GET BOTH WITH W-S O-RING FLANGE UNIONS

NOW, you can install high pressure piping systems that can easily be rearranged and adapted with full assurance that the unions will give the leak-proof service of permanent installations. This is made possible by these adaptable features of W-S O-Ring Flange Unions:

- Available in 2-bolt and 4-bolt types, according to size.
- Sizes ¼" to 1" in 2-bolt 3000#; sizes 1" to 4" in 4-bolt type 3000#; sizes ½" to 3" in 4-bolt type only 6000#.
- Available in Screw-end and Socket Welding Types—3000# and 6000#.
- O-Rings available in a variety of materials for a wide range of service.

Specify forged steel W-S O-Ring Flange Unions for a tight seal against fluid pressure in piping for hydraulic machinery, refrigeration piping, steam and water lines, process liquid and gas lines, and many other applications.

For full specifications, write for Bulletin U-1-58

W-S manufactures a full range of high quality drop forged fittings, unions and couplets . . . in carbon, stainless and alloy steels. For full information about these products, or for your specification forging requirements, write to: W-S Fittings Works, H. K. Porter Company, Inc., Box 95, Roselle, N. J.

H. K. PORTER COMPANY, INC.

FORGE AND FITTINGS DIVISION

W-S Fittings Works, Roselle, N. J. • Cleveland Forge Works, Cleveland 4, Ohio
Stainless Steel Works, Duncannon, Pa.

such advantages of using butterfly valves on altitude-tank control as: (1) absence of springs; (2) low head loss; (3) small lines or orifices to clog up; (4) no line strainers required; (5) wide band adjustment from ½ to 15 psi.; (6) easy to install and adjust; and (7) repeatability of control point. **Write or call: B-I-F Industries, Inc., 345 Harris Avenue, Providence 1, for Bulletin Reference 650.20A-1.**

Bulk-terminal additive systems

. . . selection simplified by new technical reference Bulletin 9480.21B-1. It explains which type—meter or pump-type—additive control to use for various mainline flows and volume per cent of additive. A selection data table outlines the additive type and equipment to use for each additive. Two additive systems are featured with schematic drawings which show the type of equipment involved in typical high and low-capacity additive systems. **Write or call: B-I-F Industries, Inc., 345 Harris Avenue, Providence 1, for Bulletin 9480.21B-1.**

Squirrel-cage induction-motor

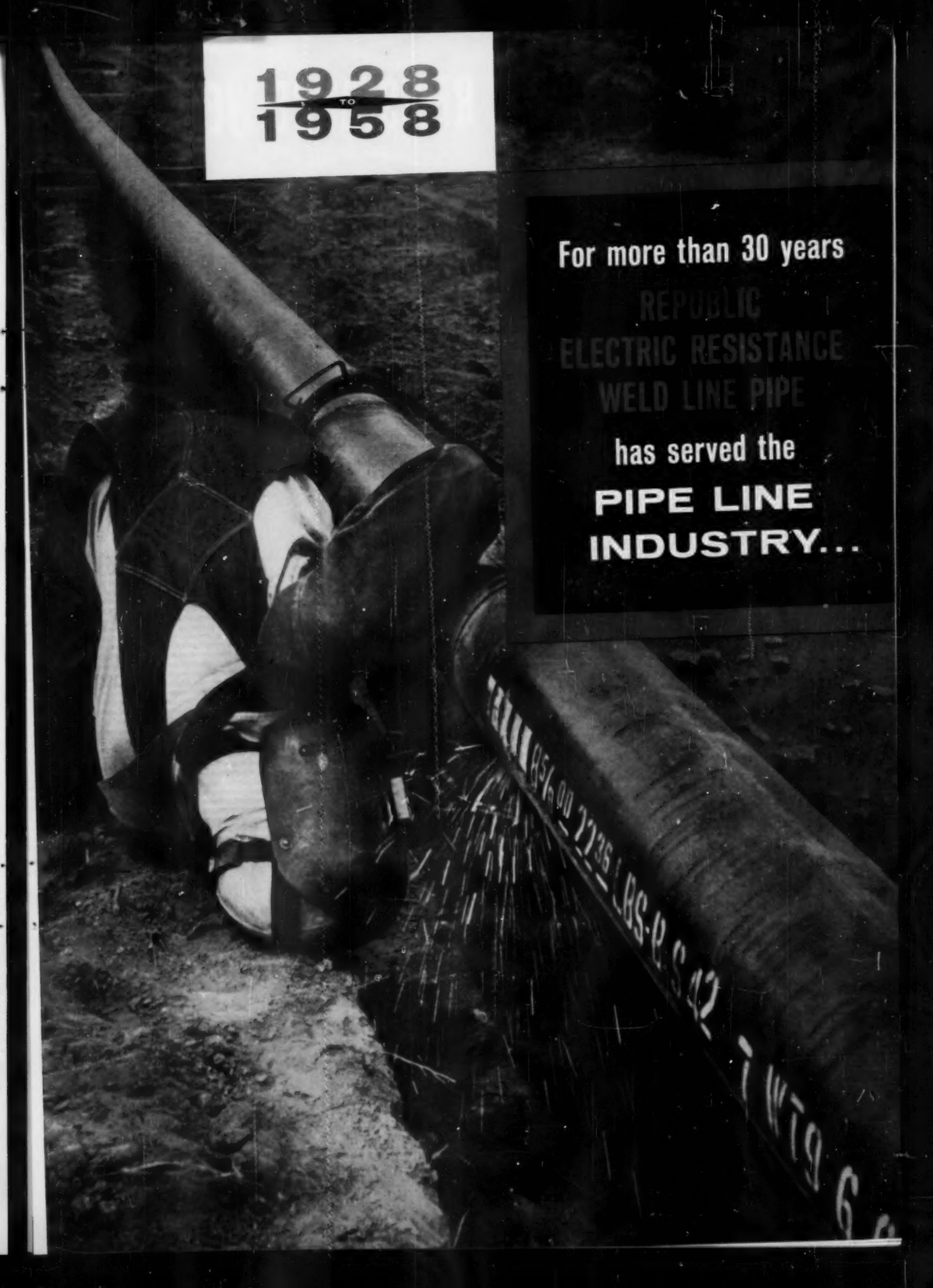
. . . controls are detailed in new two-page Bulletin 3300-PRD-249. The controls take up a small amount of space as they can be mounted side-by-side, back-to-back, or back-to-wall. The bulletin contains photos, specifications, dimensions, and drawings. It also explains a new mechanical-interlocking system. **Write or call: Electric Machinery Mfg. Co., 821 Second Avenue S.E., Minneapolis 13, for Bulletin 3300-PRD-249.**

"Obstructionless" magnetic flowmeter

. . . and magnetic-flowmeter instruments are detailed in five new Specifications Sheets 51-1101B-1 through 5. The sheets give full technical data on indicating and controlling instruments designed for use with a new magnetic flowmeter. **Write or call: Fischer & Porter Co., 834 Jacksonville Road, Hatboro, Pa., for Specifications Sheets 51-1101B; 1 through 5.**

Plastic-packing material

. . . used in the biological oxidation of liquid wastes is described in a new 32-page bulletin. The material is known as Dowpac. The bulletin contains the product's physical properties, assembly instructions, and operational characteristics. It explains the wide-design latitude possible with Dowpac, and includes performance data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For more than 30 years
REPUBLIC
ELECTRIC RESISTANCE
WELD LINE PIPE
has served the
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REPUBLIC ELECTRIC RESISTANCE WELD LINE

From sea to sea, the U.S.A. extends over a breadth of more than 3,000 miles. Equally as broad is the confidence placed by the oil and gas industry in Republic Electric Resistance Weld Line Pipe.

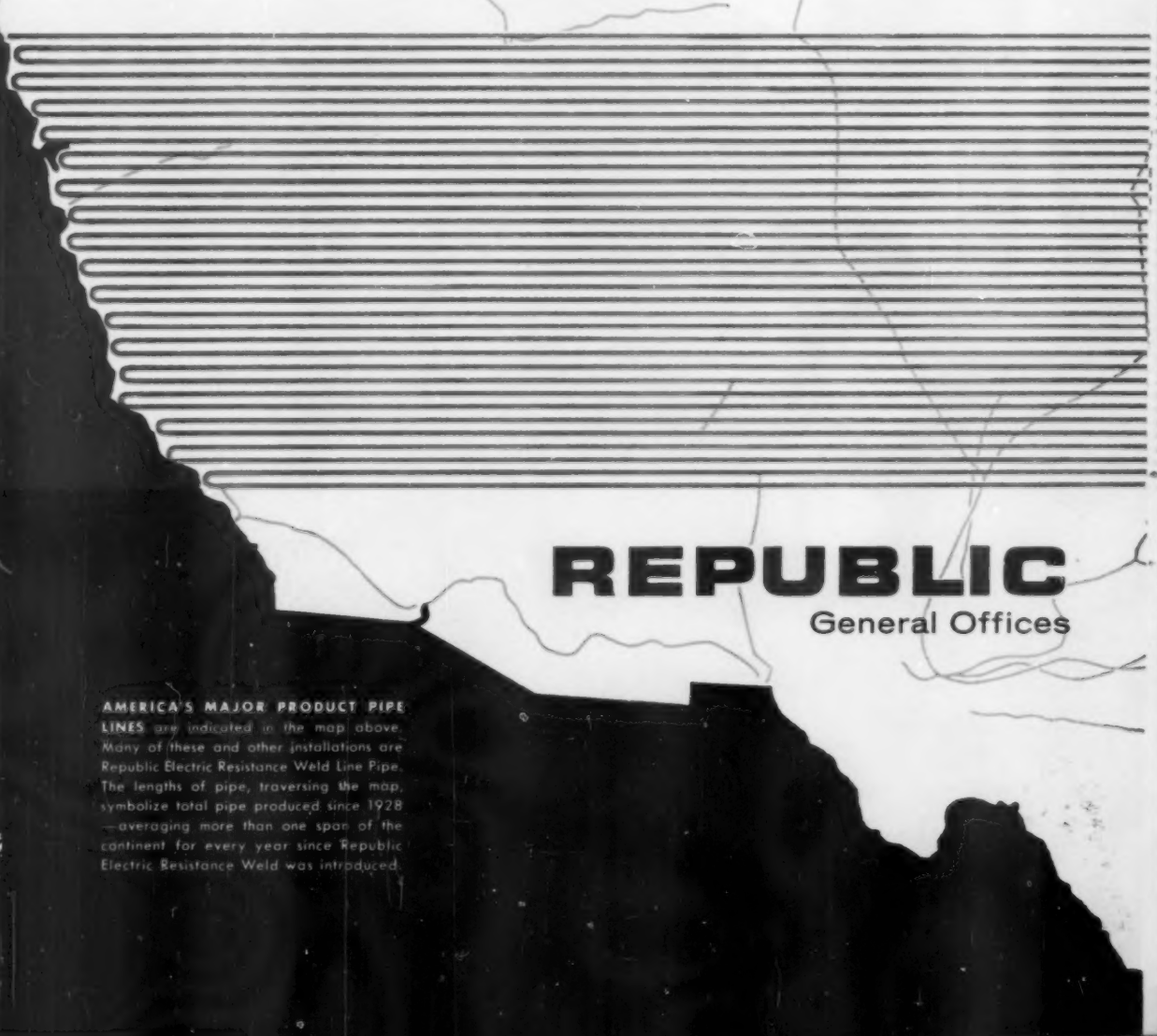
Since 1928, when Republic developed its revolutionary pipe-making process, more than 107,000 miles of Republic Electric Weld have been produced. Today, it provides dependable, trouble-free service in every quarter of the nation. Here is one reason why:

Precise uniformity is sought at every stage of manufacture. The process begins with flat-rolled steel, which is carefully checked and tested right at the rolling mill for absolute uniformity of thickness.

Then the flat-rolled steel is converted into uniformly concentric cylinders. Edges are joined by electric resistance heat and pressure to create a weld as uniformly strong as the pipe wall itself.

The result is a pipe with uniform high yield strength, made to order for high-pressure service. It is a pipe of cold formed steel, extra ductile for smooth, uniform bends. And it is a pipe that goes into the ditch fast . . . that can be lined up quickly, with absolute accuracy for sound, low-cost field welding.

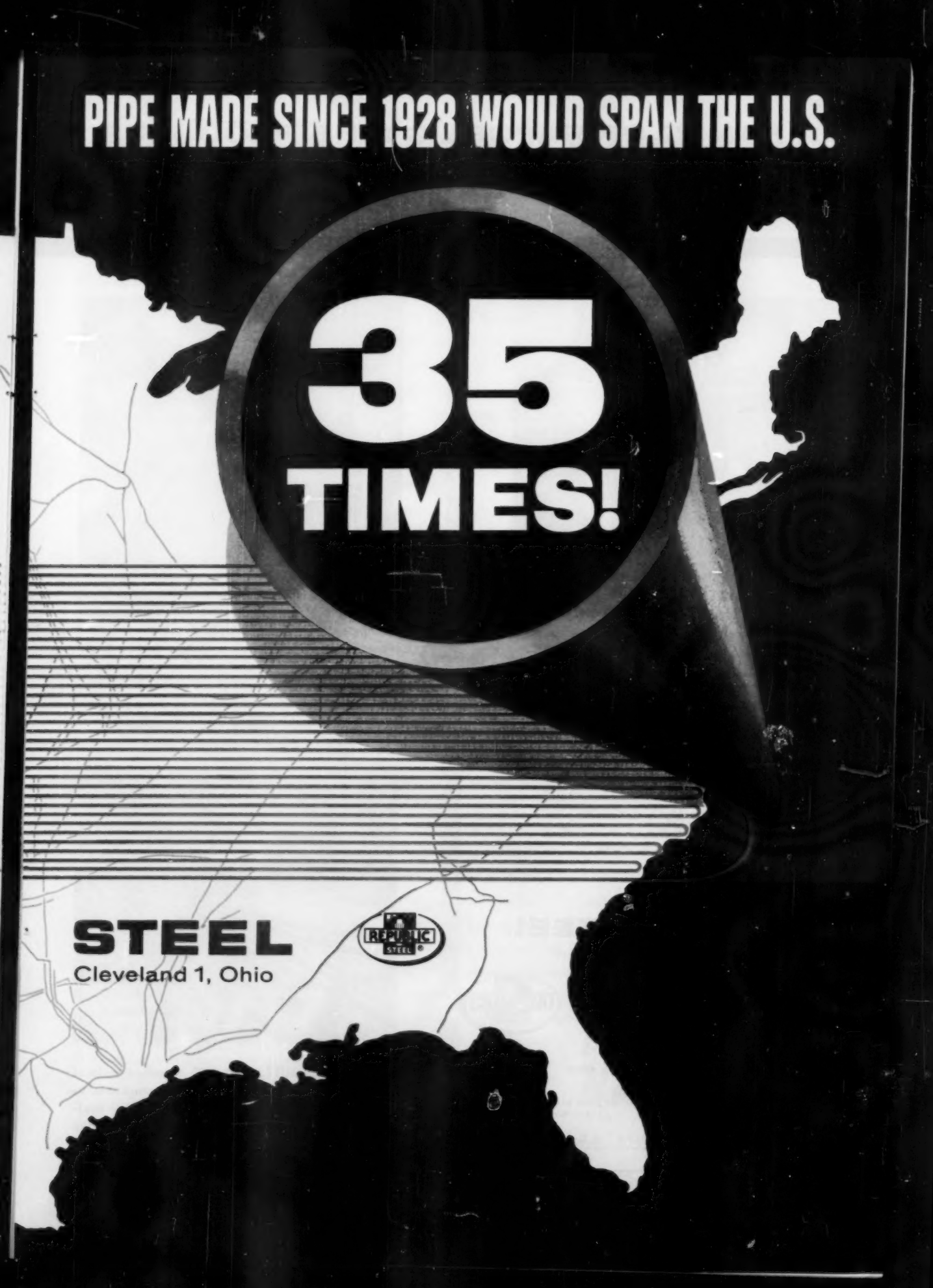
Today—after 30 years, and enough electric weld line pipe to span America 35 times—Republic is a leader in pipe-making experience. Nobody knows more about making electric welded steel pipe than Republic—staffed with people who know the pipe line industry as well as they know steel!



REPUBLIC
General Offices

AMERICA'S MAJOR PRODUCT PIPE LINES are indicated in the map above. Many of these and other installations are Republic Electric Resistance Weld Line Pipe. The lengths of pipe, traversing the map, symbolize total pipe produced since 1928 —averaging more than one span of the continent for every year since Republic Electric Resistance Weld was introduced.

PIPE MADE SINCE 1928 WOULD SPAN THE U.S.



A RANGE OF REPUBLIC PIPE PRODUCTS SERVE THE OIL AND GAS INDUSTRY

SRK PLASTIC PIPE for fluid handling applications where corrosion is a factor. Republic SRK is lightweight for low-cost shipping and easy handling. It is easy to cut, easy to join, makes a permanent installation fast—above or below ground. SRK (Semi-Rigid Kralastic) provides good impact resistance, is immune to damage from sunlight or electrolytic action. Republic also produces SRB (Semi-Rigid Butyrate) and FE (Flexible Polyethylene) plastic pipe, all available in a full range of sizes. Send coupon for facts.

REPUBLIC STEEL

General Offices • Cleveland 1, Ohio

X-TRU-COAT is Republic's new bright yellow pipe, combining the strength of steel with the corrosion-resistance of polyethylene plastic. It's actually two pipes in one. Tough polyethylene in a sunlight-defying bright color is extruded over and permanently bonded to selected steel pipe or tubing. Ideal for all applications in which external corrosion may be a problem. Easy to install; can be bent and joined by conventional methods. Send coupon.

CONTINUOUS BUTT WELD PIPE is stocked by local distributors for quick delivery any place, any time. Its uniform strength and ductility, tight galvanized coating, ease of threading, bending, and welding, make it ideal for gathering and distribution lines and general maintenance work. Available in economical double-random lengths, in sizes ⅛" through 4" nominal. Mail coupon for more data.

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Please send latest bulletins describing

- ☐ Electric Weld Line Pipe
- ☐ Plastic Pipe
- ☐ X-TRU-COAT
- ☐ Butt Weld Steel pipe

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gathered from a variety of pilot-plant installations. **Write or call: The Dow Chemical Co., Plastics Merchandising Dept., 1000 Main Street, Midland, Mich., for Dowpac bulletin.**

Fan-cooled worm gear speed reducer

. . . mounts at top, bottom, vertical, sidewall, or angled drive, as shown in new Bulletin 5018. It gives complete horsepower and torque data for worm-gear units built on 2½ to 4-in. centers. Speed-reduction ratios ranging from 70:1 to 5:1 are given for heavy-duty industrial uses where continuous running is needed. The bulletin tabulates dimensions of the units in various sizes and gives materials and design of the interchangeable components. Compact speed reducers employ aluminum fans to cool the cast-iron casing. **Write or call: De Laval Steam Turbine Co., North Clinton & PRR, Trenton 2, N.J., for Bulletin 5018.**

Cable, rope-laid slings

. . . are outlined in new four-page Bulletin 5886. The cable-laid slings are recommended for uses where a soft-sling body is needed and where flexibility is more important than resistance to abrasion. The rope-laid slings are designed for uses where abrasion resistance is more important. The bulletin gives specifications, load ratings, and standard fittings for ¼ to 1½-in. diameters. **Write or call: Macwhyte Co., Fabricated Products, Kenosha, Wis., for Bulletin 5886.**

Custom steel, alloy plate

. . . fabrications in the 3/16 to 1¼-in. range are detailed in a new eight-page brochure. The brochure illustrates pressure vessels, tanks, fractionating columns, large o.d. piping, field-erected breechings, and stacks. It shows how the equipment is shop-fabricated, X-rayed, stress-relieved, and field-erected for use. **Write or call: Missouri Boiler & Tank Co., 2211 Papin Street, St. Louis 3, for Custom Steel and Alloy Plate Fabrications brochure.**

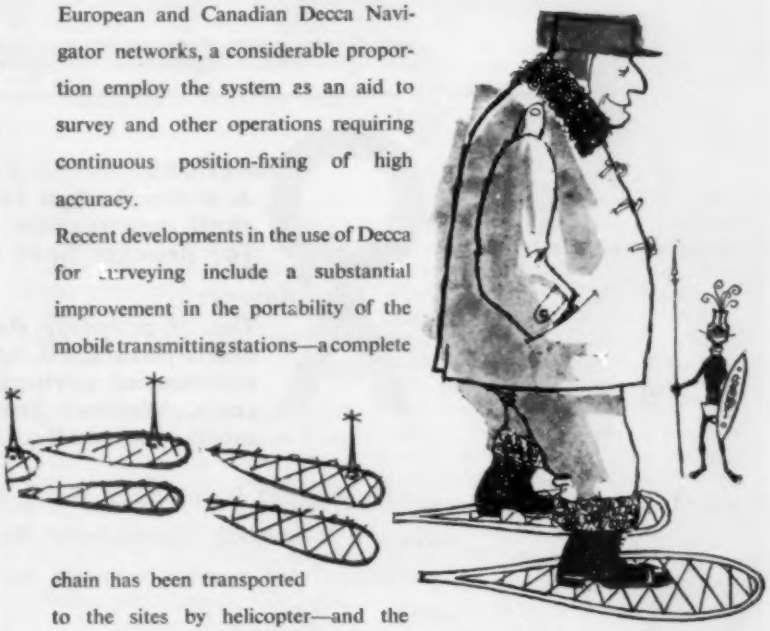
Heavy-duty limit switches

. . . for industrial uses are outlined in new 16-page Catalog 84. It lists switches with a variety of contact arrangements for either direct of alternating current uses and shows several actuator designs for each type. The catalog includes photos and illustrated drawings of the switches. **Write or call: Micro Switch division of Minneapolis-Honeywell Regulator Co., Freeport, Ill., for Catalog 84.**

FROM NEWFOUNDLAND TO NEW GUINEA

. . . more than 20 mobile Decca chains are currently deployed to cover air, marine and ground survey and exploration projects. In addition to the 4,300 ships and aircraft using the permanent European and Canadian Decca Navigator networks, a considerable proportion employ the system as an aid to survey and other operations requiring continuous position-fixing of high accuracy.

Recent developments in the use of Decca for surveying include a substantial improvement in the portability of the mobile transmitting stations—a complete chain has been transported to the sites by helicopter—and the introduction of an automatic dead-reckoning element into the Decometer and Flight Log display systems. This device, already used with marked success in two air-borne geophysical surveys, eliminates the need for manipulation of the airborne receiver while in flight and the attendant risk of lane error; it also considerably increases the service-area of low-power transmitting stations under the radio noise-level condition encountered in the tropics.



THE DECCA NAVIGATOR

Mobile Chains for Exploration and Survey

THE DECCA NAVIGATOR COMPANY LTD., LONDON, ENGLAND

Is multi-pass shell construction practical in heat exchanger design?

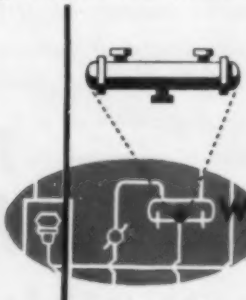
Question:
Are the design features of multi-pass shell construction sound and applicable for process heat exchangers?

Answer:
***Yes, if properly designed and applied,* multi-pass shell heat exchangers effect substantial savings in initial installation costs. Western has been successful with multi-pass shell construction because . . .**

. . . of a thorough knowledge of the applications for which each Western heat exchanger is designed. Consequently, Western two-pass shell exchangers are recommended and specified only for those applications where they are ideally suited.

Western multi-pass shell exchangers have achieved satisfactory service for our customers at far lower investment cost. By reducing the number of shells required to handle specific applications, the Western multi-pass shell exchanger does the work of two exchangers at substantially lower initial cost.

A Western representative will gladly advise you as to the possibility of applying two-pass shell construction to your next heat transfer requirements.



WESTERN
HEAT EXCHANGERS
WESTERN SUPPLY COMPANY
P. O. Box 1888 – Tulsa, Oklahoma

FWD approves construction

... of a new two-story engineering building, according to James A. Driessen, Four Wheel Drive Auto Co. executive vice president. The 120 ft. by 60 ft. building will have approximately 15,000 sq. ft. of space. Completion is scheduled for spring of 1959.

T. D. Williamson, Inc. opens

... a branch office in Houston and installs a factory representative in Monroe, La. H. A. Lister, former

H. A. Lister

Jerry Johnson

division pipeline superintendent for Champlin Oil & Refining Co., was named the Houston district manager. Jerry Johnson, formerly with Tod Pazdral Pipeline Specialties, was named factory sales representative covering the Monroe, Baton Rouge, Shreveport, Birmingham, and Atlanta areas.

Stewart & Stevenson named

... a distributor for the industrial and oil-field industries of Chicago Pneumatic engines, announces Joe Manning, Stewart & Stevenson Services, Inc., vice president and general manager. The distributor will handle the complete line of Chicago Pneumatic engines. The engines will be available in sizes up to 2,000 hp.

International Harvester model incorporates

... custom designs of Halliburton Oil Well Cementing Co. The tandem-driven fracturing unit is teamed up with other pumps, blenders, and bulk units to "fracture" a newly drilled field producing formation in New Mexico. Equipment mounted on the Model VCOF-405L has a pumping rate of 24 bbl. per minute.

British subsidiary formed

... by Raymond International, Inc., reports George F. Ferris, president. The new company, Raymond International (U.K.), Ltd., offers engineering and construction services to clients in the United Kingdom and other Commonwealth nations, colonies, and protectorates.

Regional contracting managers

... are appointed by American Bridge Division of U. S. Steel. Walter Schielke, the division's top Houston official, and J. H. Long, his predecessor at Houston, received the appointments from W. B. Hunter, division vice president, contracting.

Schielke will supervise contracting offices in Houston, Birmingham, Atlanta, Memphis, and Orange, Tex. He will headquarter at Houston. Long, stationed at New York, will supervise offices in New York, Baltimore, Boston, Philadelphia, Elmira, and Trenton.

Schlumberger announces

... five new appointments. J. T. Foster has returned to Schlumberger Well Surveying Corp. as senior sales engineer in the Texas Gulf Coast division at Houston. W. H. Throop has been named location manager at Monroe, La. Lee Petty, formerly division sales manager at Corpus Christi, has been promoted to district manager of that area. A. Kane, formerly manager at Fullerton, Calif., is now senior sales engineer at Los Angeles. J. S. Baldry of Abilene has been appointed as sales engineer in Abilene.

B. J. (Bill) Bucy is promoted

... to division engineer of Western Co.'s Oklahoma City division, announces Walter Beadle, vice president of operations and sales. Bucy formerly was electronics and explosives engineer at Western's Midland, Tex., research facilities. He has been with the company since 1951, serving in both operations-sales and research and development capacities.

B. J. Bucy

Personnel changes announced

... by Houston Oil Field Material Co., Inc. L. W. Abbott transfers from Houston to Beaumont, Tex. W. S. Baker transfers from Kimball, Neb., to Billings, Mont. R. J. Bradshaw shifts from Houston to Odessa, Tex. Glen Harbert moves from Corpus Christi, Tex., to sales and service engineer at Houston. John Kennedy goes from Venice, La., to Hobbs, N. M. E. K. Konnerup shifts from Casper, Wyo., to Kimball. L. D. McQuaid

Alco, MWL representatives are shown following

... agreement under which MWL Tool & Supply Co., Midland, Tex., will act as sales agent for Alco Products, Inc. Pictured are Gordon West, MWL; O. C. (Lefty) Sloan, Alco; Ed Lindsey, MWL president; C. E. Paggi, Alco; and T. L. Fontaine, Jr., Alco. MWL, which has been operating in West Texas and the Rocky Mountain area for 6 years, will cover the New Mexico, Colorado, Utah, and Arizona territories. James B. Sappington was appointed oil-field product sales agent for North Central Texas.

HERE'S PACKAGED PROOF!

OF THE GROUND BELOW THE RIG

There's no need for second guessing about productive strata when the evidence is right before your eyes. The new rubber sleeve core barrel delivers cores in a complete package even in soft, unconsolidated formations.

Formerly, soft formation cores were unobtainable due to grinding and drilling fluid wash. Now the rubber sleeve wraps them tightly, keeps them intact, and offers maximum protection against washing, blocking or friction grinding. Cores are delivered, "packaged as cut," ideal for analysis, handling and shipping.

Every dollar you invest in a well is spent for the sole purpose of discovering oil. For minimum risk in exploration, you must evaluate the formation below the rig. The only sure method of formation evaluation is coring. The development of the Rubber Sleeve Core Barrel has greatly expanded the area in which you can obtain the vital information you need to determine a productive field. With the addition of the soft formation rubber sleeve core barrel to a complete line of conventional and wireline barrels, Christensen has a core barrel to fit your needs, regardless of the formation type.

Call the Christensen representative nearest you and get the "Hole" story.

For more detailed information on the rubber sleeve core barrel, ask for RS-801. For additional information on conventional or wireline core barrels, ask for CB-608.
Write or call
Christensen Diamond Products

Diamonds Mean, "Less cost per foot."

CHRISTENSEN DIAMOND PRODUCTS

1937 SOUTH SECOND WEST • SALT LAKE CITY, UTAH

moves from Corpus Christi to Houston. E. S. Mason transfers from Hobbs to Pampa, Tex. J. R. Parker shifts from Midland, Tex., to Houston. David Peters moves from Odessa to Houston. R. M. Smith switches from Houston to Beaumont. J. W. Strickland switches from Billings to Casper; and W. A. Westbrook goes from Carrizo Springs, Tex., to Freer, Tex.

Fred E. Cooper, Inc. promotes

... W. S. Jacobsen to general sales manager. He joined the company in 1953 as Texas Gulf Coast representative in Houston. His oil-field equipment sales experience has been in Oklahoma, New Mexico, Louisiana, and Texas.

H. Robert Baer appointed

... sales representative in the northeastern Ohio and northwestern Pennsylvania territory for Leschen Wire Rope Division, H. K. Porter Co., Inc., according to Gordon N. Dow, general sales manager. Baer will make his headquarters at Canfield, Ohio.

English firm to produce

... Industrial Instrument Corp.'s flowmeter line. W. M. Reese, president of Industrial Instrument, was a visitor at Elliott-Automation, Ltd., in London, to assist that firm in beginning production. Elliott-Automation will manufacture the instruments under exclusive licensed agreement. The I.I.C. instruments will complement the London firm's own line of instrumentation.

Three personnel changes

... for Garrett Oil Tools, Inc., a division of U. S. Industries, Inc. W. J. (Monk) Simon has transferred from Lafayette to Houma, La., as branch manager, reports Jack Conner, South Louisiana district manager. Simon joined Garrett in 1950.

Conner also announced the transfer of Larry Johnson from Shreveport to the Marrero office as sales engineer. Johnson started with Garrett in 1957.

James M. South has been transferred from Oklahoma City to Perryton, Tex., announces C. Burt Sheets, Oklahoma's district manager. South will be in charge of operations in the Panhandle area. He has been with A-1 Bit & Tool Co. and Garrett since 1951.

Joy Manufacturing Co. elects

... Louis G. Helmick, Jr., executive vice president, a director of the company, according to W. L. Wearly, president. Helmick joined Joy in 1947 and became executive vice president in June 1958. Prior to that time he had served as vice president and general manager of Joy's industrial division.

Personnel changes announced

... by Oil Country Equipment Co., Inc., Houston. C. Wayne Shively was elected chairman of the board. O. W. Brooks was elected president. He succeeds M. F. Wright, who resigned to become president of Pathfinder Products, Inc., Bastrop, Tex. Also announced is the election of W. B. Duncan as executive vice president in charge of sales.

74 sales personnel complete

... Gardner-Denver Co.'s first management school. The 6-day school offered instruction in problem solving, decision making, motivation, and personnel supervision. It was designed for Gardner-Denver men who have been receiving increasing management responsibilities or who will be assuming positions of greater responsibility in the future, according to George

DRILEXCO Rigs and crews are operating in —

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Louisiana
Mississippi
New Mexico
Texas
Bolivia
Brazil
Colombia
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Iraq
Turkey
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W. Gutekunst, vice president in charge of sales.

Ideco, Inc. is appointed

... exclusive export sales representative for Walker Well Heads, Inc. The announcement was made by George W. (Jack) Walton and D. C. (Clint) Walker, presidents of Ideco and Walker, respectively. Ideco is one of the Dresser industries.

No change will be made in the distribution of Walker products in the United States and Canada. Warehouse stocks for the domestic market are carried by supply stores in the major oil-producing centers.

McNaughton fills new post

A. J. McNaughton becomes operations manager at T. D. Williamson, Inc. He was formerly assistant production manager for Century Electronics & Instruments, Inc. Previous to this, he was plant superintendent for Walter O'Bannon Co.

Marvin Peterson joins

... Texas Electric Steel Casting Co. as a salesman for the Houston, West Texas, and South Texas areas, according to W. M. Ferguson, sales manager. Peterson was formerly a salesman with a metal-fabricating firm.

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Plant construction begins

... on Tube-Kote, Inc.'s new $250,000 pipe-coating plant near Midland, Tex., reports George Holm, vice president and general manager. The plant is being built on a 17-acre plot and should be ready for operation Mar. 15, 1959. It will have a capacity of coating 10,000 feet of pipe daily and will serve the oil-field tubular-coating needs for the Permian basin.

Three district managers named

... by Marsh Instrument Co. of Skokie, Ill. The three men—James Kelly, Mansur Storrs, and Don L. Warner—will have jurisdiction over the company's Midwestern, New England, and Philadelphia areas. James Kelly, who has been with the company for eight years, will head the Midwestern district. Mansur Storrs, a Marsh sales staff employe for five years, will handle the New England territories of Maine, Vermont, New Hampshire, Connecticut, Rhode Island, and Massachusetts. The Philadelphia sales office will be headed by Don L. Warner. He has been with the company for 10 years.

James Kelly

Mansur Storrs

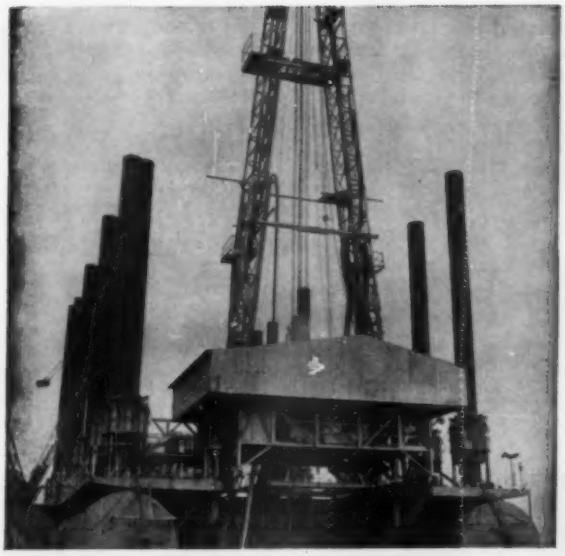
Don L. Warner

George G. Yeager appointed

... technical sales representative of oil-field sales for the petrochemical department of Continental Oil Co. He will locate in Lubbock, Tex., and will be in charge of a newly created district centering around Lubbock and Borger, Tex., and extending as far west as the Four Corners area of New Mexico and Colorado. Yeager joined Continental in August 1958.

Bovaird Supply Co. reelects

... all company directors and officers. Directors are D. D. Bovaird, president; R. G. Ayers, vice president and general manager; R. E. Batchelor, vice president and general manager of sales; W. J. Bovaird, sales manager; T. H. Trower, secretary-treasurer; A. E. Booth, independent operator,



Trans-Gulf uses REDA Submergible Electric PUMP for Offshore Drilling

Trans-Gulf Offshore Drilling Inc., uses Reda Submergible pumping equipment to provide water for such rig operations as mud mixing, rig washdown and fire protection.

The 20 H.P. Reda used in this application produces 570 g.p.m. against 100 feet head. Its corrosion-resistant construction assures long life and dependable service.

Reda Pump Company has over 35 years of experience in the manufacture of pumps handling corrosive liquids and offers a complete line of pumps:

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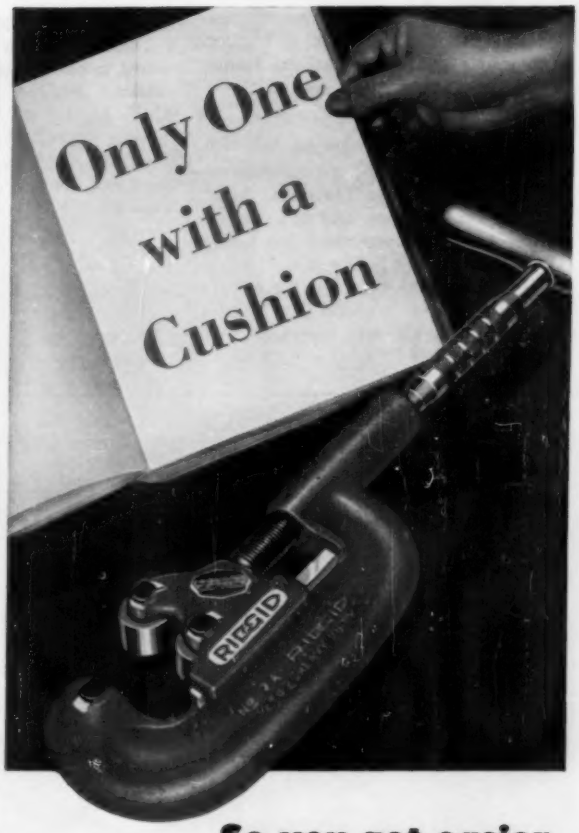

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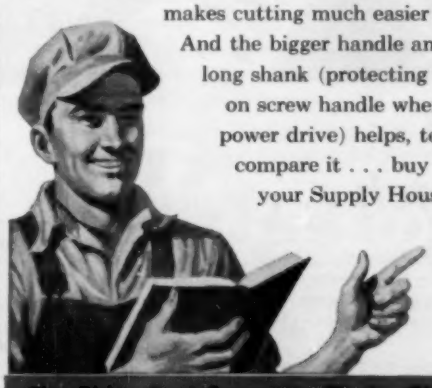


The Ridge Tool Company, Elyria, Ohio, U.S.A.

Bradford, Pa.; B. J. Williams, president of Williams, Boesche, & McDermott; and R. M. McMahan, former company secretary now retired.

Atlas Valve Co. names

... four new sales representatives. W. C. Christianson, Jackson, Miss., will cover that state; and in Louisiana Atlas will be represented by Moore Instruments, Inc., Houston. R. L. Crane, Charlotte, N. C., will cover the Carolinas; and Weedon Engineering Co., Jacksonville, will represent Atlas in Florida.

E. M. Renfro appointed

... sales engineer of the industrial water conditioning division of Maintenance Engineering Corp., reports C. E. Naylor, chairman of the board. Maintenance Engineering is located in Houston and is a supplier of refinery, pipeline, steam, and chemical plant equipment.

J. C. Hellner Co. selected

... as manufacturer's representative in the Denver area for C. Lee Cook Co., according to W. H. Barnes, Cook sales manager. John C. Hellner is president of the recently formed representative organization. Since 1956 Hellner has been with Darling Co. and previous to that was with Cooper-Bessemer Corp.

Five given new appointments

... by Reed Roller Bit Co., reports John Maher, president. The men—J. A. Grundy, Wiley B. Noble, G. L. Gilbert, R. G. Stockton, and T. B. Ellis—collectively have worked 97

J. A. Grundy Wiley B. Noble

years for the company. Grundy, formerly vice president, manufacturing, and a Reed employe for 16 years, was appointed operating vice president and will direct all operations exclusive of sales and finance.

Noble, former head of engineering, will carry out sales and engineering liaison activity. He has been with the company since 1935.

G. J. Gilbert R. G. Stockton

Gilbert, a Reed employe for 22 years, was named chief engineer. He had served as assistant in this capacity.

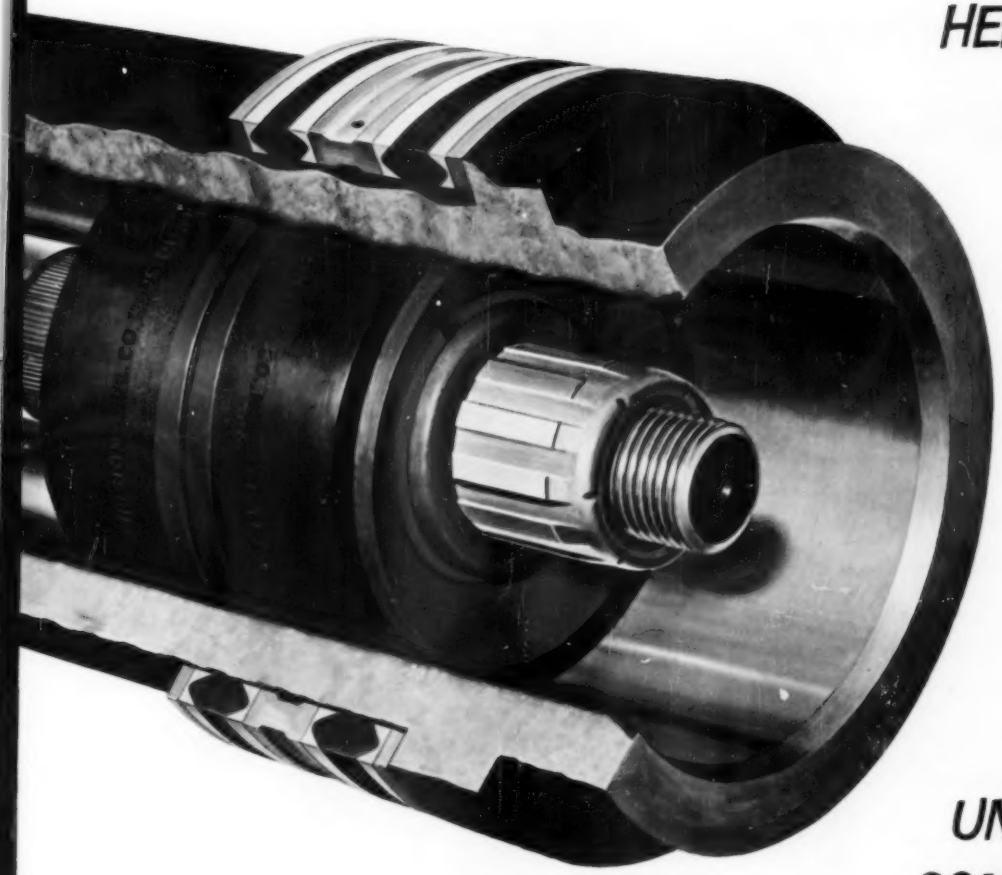
T. B. Ellis

Stockton, former purchasing agent, is now materials manager. He has been with Reed 20 years.

Ellis who has been chief industrial engineer, was promoted to factory manager. He joined the company in 1942.

Leinweber and August join

... the sales force of the Houston branch of Norvell-Wilder Supply Co., reports Herman Berwick, Houston branch manager. G. F. Leinweber has broad experience in industrial sup-



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Forged steel piston bodies feature an accurately machined, induction-hardened, Missionized flange that gives long life and extends both piston rubber and liner life.

Liners last longer when Mission Pistons are used because the fabric back of piston rubbers reduces the danger of serious scoring or fluid cutting.

MISSION LINERS keep down piston and liner packing costs as well as liner costs.

For normal to heavy-duty service, Mission Super-Service® Liners are recommended. They feature an accurate, uniformly induction-hardened bore that keeps down piston costs as well as liner costs.

For corrosive service, Mission offers Corrosion Resistant Liners fitted with hardened stainless steel sleeves. In certain areas, these liners have reduced combined piston and liner costs by more than 50 per cent.

In addition, all Mission Liners feature accurately machined outside diameters to assure the longest possible liner packing life.

MISSION SUPER-SERVICE® LINER PACKING feature zero-clearance confinement of packing rings. This exclusive construction has increased packing life so much that costs are often reduced by more than two-thirds.

Taken individually, the savings that result from using *any* of these Mission Pump Parts is substantial. When used together, savings pyramid and down-time is substantially reduced. This is the reason why Mission Pistons, Mission Liners and Mission Liner Packing make an unbeatable combination.

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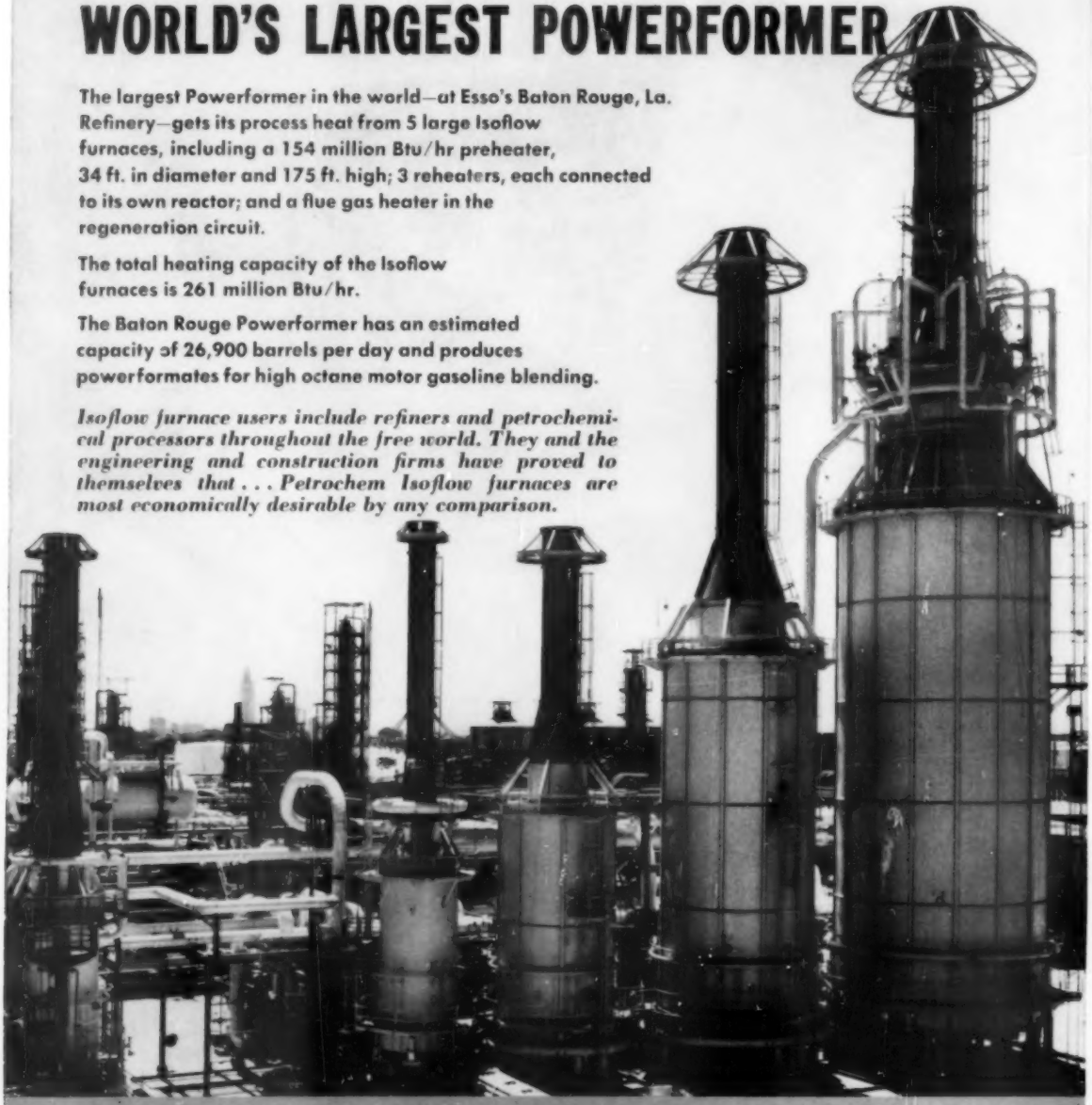
The total heating capacity of the Isoflow furnaces is 261 million Btu/hr.

The Baton Rouge Powerformer has an estimated capacity of 26,900 barrels per day and produces powerformates for high octane motor gasoline blending.

Isoflow furnace users include refiners and petrochemical processors throughout the free world. They and the engineering and construction firms have proved to themselves that . . . Petrochem Isoflow furnaces are most economically desirable by any comparison.



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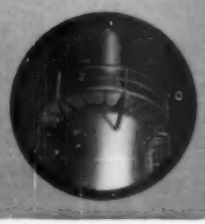

plies. A. L. August will continue to specialize in the sale of oil-field supplies and equipment.

Peter W. Cooke is appointed

. . . manager of the newly created Magcobar Division of Dresser (Great Britain) Ltd., and will be responsible for the company's activities in Europe and the Middle East. He will also represent Magcobar's industrial department and will headquarter in London. Cooke formerly was with British Petroleum Co.

W. F. Dickinson named

. . . sales representative for Southern Pipe, a division of U. S. Industries, Inc. Dickinson formerly represented Fabricated Steel Division of U. S. Steel on the West Coast for 22 years.

Dow Chemical Co. announces

. . . two personnel changes in its sales department. J. W. Harris, manager of organic chemicals sales, was appointed assistant to L. B. Grant, sales manager of the chemicals department. Earl H. Farnham was named manager succeeding Harris. Harris has been with Dow since 1932 and Farnham started with the company in 1945.

Pipeline equipment inspected

. . . by Serge Sylvian, chief engineer for Entrepose Co.'s Iran division; John Manley, sales manager for M. J. Crose Mfg. Co., Inc.; and John Behrenfeld, Crose vice president and sales manager. The equipment is a set of Crose Trac-Wheels which are being used on pipe-coating kettles and bending machines. Sylvian visited Crose as part of a three-month tour of pipeline construction projects and operating installations in the United States. Crose's equipment is used extensively in Entrepose's construction. Entrepose is located in Paris.

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Stand lifts, holds, tilts 55 gal. barrels Prevents spillage—easily loaded.

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XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

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Who's getting the drilling contracts

Delta Drilling Co., Tyler, Tex., has contracted with Forest Oil Corp. for a 12,500-ft. well in the Second Lake area in the tidal marshlands of southwestern Louisiana's Cameron Parish. The new well, 1 Doland, in 8-15s-5w, is being drilled in an attempt to confirm a discovery by Fifteen Oil Co. in 1955. Fifteen Oil's discovery well, productive of gas and condensate from a 11,800-ft. sand, has been the only successful operation in the field, inactive since 1956.

Fleet Drilling Co., Ada, Okla., is getting under way on Sinclair Oil & Gas Co.'s fourth well in the recently opened significant North Buffalo area in Harper County, western Oklahoma. The new operation, 1 Shupe, in 32-29n-22w, is a ¾-mile northeast step-out. The field is proving prolifically oil productive from four horizons, the Lansing, Kansas City, Oswego, and Arbuckle, all above 7,900 ft.

Fortenberry Drilling Co., Natchez, Miss., has a new Wilcox operation in the LaGrange area of Adams County, southwestern Mississippi, where it is drilling for Calto Oil Co. and G. W. Gulmon. Its location, at 1 Craig-Ayres Unit, in 93-7n-2w, is about a mile from production. Contract is for 6,300 ft.

Crow Drilling & Production Co., Shreveport, is associated with W. H. Potts and Wallace R. Gunn in the drilling of a 9,100-ft. Lower Cretaceous wildcat in northwestern Stone County, South Mississippi. Crow is contractor on the job, located at 1 Peck, in 2-2s-13w. Location is about 8 miles northwest of Wiggins, and 4 miles south of Pistol Ridge-Maxie field, nearest production.

Stickle Drilling Co., Tulsa, is on a new wildcat operation in southwestern Lane County, western Kansas, as contractor for Sunray Mid-Continent Oil Co. The Sunray job, a 4,800-ft. Mississippian test, at 1 Wolfe, in 26-20-30, is 15 miles southwest of Dighton. It is northeast of the Hugoton gas area.

Jack Grace Drilling Co., Wichita, Falls, Tex., is drilling for **E. B. Clark Drilling Co.,** also of Wichita Falls, at a wildcat location in northeastern Hutchinson County, Texas Panhandle. Location is 25 miles northeast of Stinnett on Clark's Patterson lease in Section 15, Block M-22, TCRR Survey. It is 4 miles southwest of a Morrow-sand discovery - well recently completed by Sun Oil Co.

Mountain States Drilling Co., Denver, has a shallow contract job in the Black Butte area, in northern Sublette County, far-western Wyoming. It is a Nuggett sand test for T. T. Ellsworth at 1-5 Government, in 5-37n-109w. Projected depth is 3,500 ft.

Kendrick Brothers, Vivian, La., have a rig under contract to Henry A. King, of Atlanta, Tex., for a 5,000-ft. Paluxy test in northern Cass County, East Texas. Location, at 1 Riley, in the John Lick Survey, is 7½ miles west of Atlanta.

Mustang Drilling Co., Tyler, Tex., is drilling a 5,000-ft. Edwards test in northern Robertson County, East Texas. It is a contract job for a group of independent operators, including William M. Brelsford, of Tyler; and B. W. Hemphill, D. L. Irwin, and Herman Whitehurst, of Longview, Tex. Location is at 1 Pascieznik, in the T. O. Meux Survey, 4½ miles northeast of Bremond.

Reading & Bates Offshore Drilling Co., Tulsa, will drill CATC Group's next well in the recently opened Eugene Island Block 208 field, 40 miles off the Louisiana coast, in the Gulf of Mexico. **Glasscock Drilling Co.'s** rig, which drilled the discovery well, completed last September, and has been working in this field, recently was pulled out to drill a relief well for a blowout in West Delta Block 45 field. The Reading & Bates rig will drill from a platform.

Field Drilling Co., San Antonio, is under way on an 8,500-ft. test it has contracted to drill for Ohio Oil Co. in the North San Antonio Bay area, near Seadrift, in Calhoun County, Texas Gulf Coast. Its location is on Ohio's Bindewald lease on the north shore of the bay.

Gibson Drilling Co., Kilgore, Tex., has a new wildcat operation in northwestern Shelby County, East Texas. It is drilling for Purnell & Coleman, Kilgore operators, whose location, at

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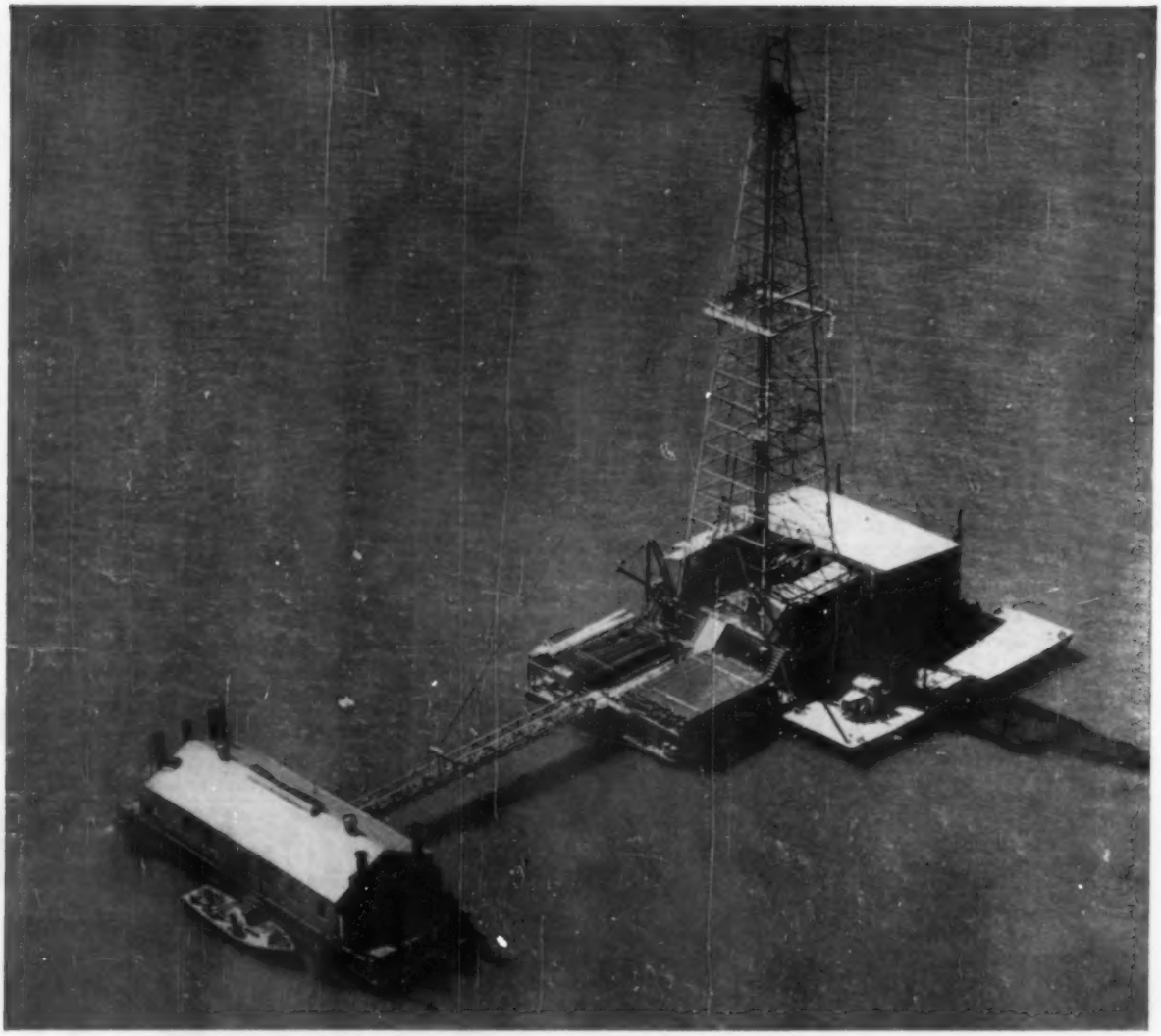

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1 Cook in the HE&WT Survey, is about 5 miles south of Timpson. Operators plan a Travis Peak test, and have a 7,600-ft. permit.

Sprecher Drilling Co., Casper, Wyo., has a rig running on the Lakota test Shell Oil Co. is putting down in the new Poison Spring Creek area, in Natrona County, Wyoming. It is a south extension with a projected depth of 6,000 ft. Location is in 5-31n-84w, and is designated as 33-5.

Harry T. Bryant Drilling Co., Houston, is contractor on another deep well Michel T. Halbouty is drilling in the Fostoria area of eastern Montgomery County, Texas Gulf Coast. Location, at 1-B Fostoria Lumber Co., in the T. J. Williams Survey, is 2 miles south of town. Permit calls for 11,500-ft. drilling.

Kirkwood & Morgan, Inc., San Antonio, has a new contract operation going in the Oakville area of Live Oak County, in South Texas. It is an 8,000-ft Wilcox test for R. L. Kirkwood and Van Lewis, of San Antonio, at 1 Harris. Location is 4 miles south of Oakville in the Dennis McGowan Survey. Kirkwood & Morgan drilled the initial well in the area as a joint operation with Forney & Worrell. It was completed as a dual gas-condensate well, and currently is the only producer. Two other wells, one drilled by Argo Oil Co., and the other by Blanco Oil Co., are shut in.

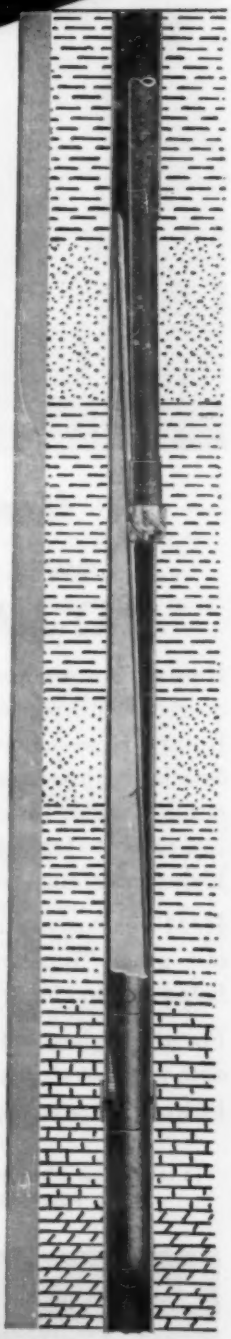
Layton & Newell Drilling Co., Fort Worth, has a rig running on a wildcat location 12 miles southeast of Carlsbad, in eastern Eddy County, New Mexico. It is a contract operation for William and Edward Hudson, Fort Worth independents, who plan to take the hole to 7,000 ft. Location, at 1 Eddy Federal, in 6-22s-29e, is 6 miles southwest of Dos Hermanos field, nearest production.

C. B. Webster Drilling Co., Houston, has the contract on the deep test Gulf Oil Corp. is starting south of Bourg field, southeast of Houma, in Terrebonne Parish, southeastern Louisiana. The test is Gulf's 1 Elmore Duplantis, in 9-17s-18e. Contract calls for 11,300-ft. drilling.

Penrod Drilling Co., Dallas, is the contractor on the deep test being started by Woodley Petroleum Co., Montgomery Oil Co., and General Crude Oil Co. south of Damon, in Brazoria County, Texas Gulf Coast. The test, 1 Groce, in the E. S. Jones Survey, is about 2 miles south of production on the Damon salt dome. Drilling permit is for a 12,500-ft. test.

NEW KINZBACH SPEEDMILLS

Slash DOWN-HOLE CUTTING TIME



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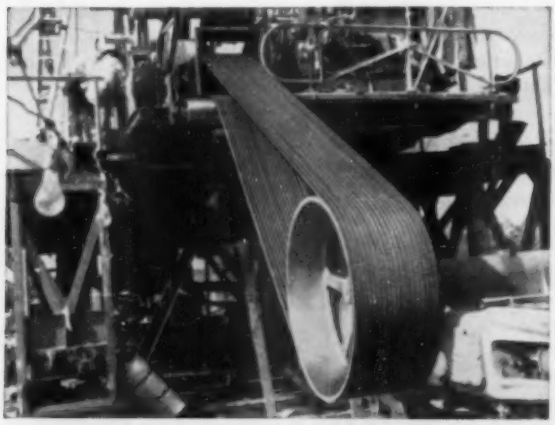

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Scoreboard on 1958 predictions

BY FRANK J. GARDNER

EACH YEAR at this time, the Journal's exploration staff busily tots up the year's score in discovery and achievement. At the same time, it compiles a series of predictions for the year ahead . . . who'll be drilling where, what areas will attract attention, new regions to watch and the outlook in general. This calls for courage, optimism, and a little audacity. Courage, because we know you'll be here to check up on us next year. Optimism, because it runs in our blood as geologists. And audacity, because any prophecy is just that.

How have we done in 1958? Did our predictions hold up? Here's a rundown on those that appeared in the January 27, 1958, issue of the Journal, followed by the record itself:

Prediction: The Williston basin will bust wide open.

The record: North Dakota had the biggest drilling year in its history, with total well completions 52% ahead of 1957. Northeastern Montana, with Ordovician and Devonian discoveries, shared the excitement. South Dakota got its third oil field.

Prediction: Brisk play in the Powder River basin.

The Record: Wyoming has been one of the busiest drilling theaters in the nation all through 1958, though total drilling is down about 12% from 1957. Of total drilling, 39.2% has centered on the Powder River basin; of wildcat drilling, 38% has been directed at Powder River.

Prediction: Major future oil provinces in the Green River, Uinta, and Piceance basins.

The Record: These three have seen an extremely busy 1958, but the target has been gas, not oil. Important multipay gas strikes have occurred at Wamsutter, Desert Springs, and Playa in Green River, plus a major oil discovery at O'Brien Springs. Piceance and Uinta have recorded at least six major gas hits this year in Mesaverde, Dakota, and Morrison sands of Cretaceous age.

Prediction: Spirited Las Animas search.

The Record: The most successful year in Las Animas arch history is drawing to a close. A handful of new oil fields in extreme northwestern Kansas has sprung from a campaign set off by the discovery at Phillips Petroleum Co. 1 Llanos, Sherman County, in May.

Prediction: Northern Paradox will see action.

The Record. It did. At nearly any time during 1958, a dozen active wildcats could be counted on the northern and northwestern flanks of Paradox. Confirmation of Pure Oil Co.'s Mississippian discovery at Big Flat, plus the coring of 110 ft. of biohermal reef in Tennessee Gas Transmission Co. 1 USA Poison Springs (now abandoned) fanned the flames west of Colorado River.

Prediction: Aneth will exceed all expectations.

The Record: The field, yes. The exploratory drilling, no. Only one oil well and one gas well from a wildcat program of 46 tests. But in contrast, 228 development oil wells and two gassers resulted from a 255-well development campaign.

Prediction: Paradox success may invade Colorado.

The Record: It happened, but barely. The California Co. finished its 2 Calco-Superior-Ute Tribal in western Montezuma County for 38 bbl. of oil per day and 24 bbl. of water from Paradox perforations at 5,800 ft.

Prediction: New world's depth record in Oklahoma.

The Record: We goofed. At year's beginning, Oklahoma had two candidates for a new record, Howell & Howell 1 Anadarko Basin and Shell Oil Co. 5 Rumberger. Who was to know at the time that Phillips would sink the 1-EE University to 25,340 ft. in Pecos County, Texas?

Prediction: Anadarko basin will seethe with activity.

The Record: The greatest year in northwestern Oklahoma's history sprang from the widespread activity in the Panhandle counties and the Woodward trend covering Major, Ellis, Woodward, and Harper counties. Operators hit at two out of every three wells drilled, over-all.

Prediction: Val Verde basin will be the prime West Texas target.

The Record: Terrell County's Brown-Bassett field, a one-well 1957 discovery, emerged as a giant gas field with Ordovician, Silurian, and Pennsylvanian pays at depths of 15,000 ft., 14,000 ft., and 5,100 ft. respectively. As it grows, this Val Verde basin field may overtake mighty Puckett field of Pecos County.

Prediction: Pescadito will pay off.

The Record: It did. In January 1958, this deepest salt dome in Texas boasted several dry holes. In April, the first producer was completed from Wilcox sand at 6,000 ft. by Ginther, Warren & Ginther et al.; a second success was made in June in a new Wilcox pay at 8,000 ft. The field lies in South Texas' Webb County, 14 miles northeast of Laredo.

Prediction: Nation's oldest province may become the newest.

The Record: New deep gas discoveries in northwestern Pennsylvania, a 72% success ratio in eastern Ohio, and a flush 400-ft. bonanza in Central Kentucky's Green County have focused the eyes of the entire industry on the eastern states again.

Prediction: New pipeline will lead to a McAlester basin boom.

The Record: No dice here. The pipeline didn't materialize, nor did the boom. But wait—Arkansas-Louisiana Gas Co. has announced 1959 scheduling of a 16-in., 100-million-cubic-feet per day line from Franklin County, Arkansas, to Helena, Ark., to fuel a large power plant there. The boom will follow the market.

Prediction: Delaware basin of Texas will see a deep-drilling campaign.

The Record: Reverse happened here. The Delaware saw a campaign, it's true, and it was a hot one, but shallow. Some deep tries were made, but without spectacular success. Wildcatters swarmed over Reeves, Loving, and Culberson counties in a fruitful search for Delaware sand pools at 1,000-2,500 ft.

That's how we did in 1958. We hope to do as well next year. We'll print a new batch of predictions in the upcoming Review-Forecast issue on January 26, 1959, then cross our fingers and watch what happens. It's been said that "Tomorrow has two handles: hope and despair." Here, we take hold of the handle of hope; you see, we're all cockeyed optimists.

. . . appraising the future by surveying the past

CALIFORNIA offshore waters and Utah reefs became exploratory goal lines in late-year wildcatting. The first major offshore discovery on the West Coast and the finding of a biohermal reef on the northwest side of the Paradox basin are two of the top exploration stories of 1958 . . . two finds that open a wide path to 1959 exploration in the West.

Pacific Ocean waters

. . . yielded the first offshore discovery accomplished under California's new offshore wildcatting program. Standard Oil of California-Humble Oil & Refining Co. 1 Summerland State, off the Santa Barbara coast, flowed oil at the estimated rate of 865 bbl. daily from Oligocene sands. This $12,000,000 wildcat is on a 5,500-acre lease. The platform can sit 25 wells.

California's first big offshore strike has stirred exploratory interest in the West. There are five parcels along the Santa Barbara Channel waiting to be drilled. Standard-Humble have another indicated strike at one of these, the 1 Gaviota-State. This was the first major oil find in the United States in 1958. The Summerland hit gives California its most lucid peek into a new drilling year in a long while. It is impossible to determine Pacific waters potentialities at this time, but one thing is certain . . . the West Coast offshore drilling age is here!

West of the Colorado River

. . . digging up the first indication of biohermal reefing in the Paradox basin may well be the most significant happening in Utah since the discovery of Aneth. Tennessee Gas Transmission Co.'s Poison Springs wildcat in Garfield County is apparently the beginning of a new look for Paradox basin exploration. The 1 U.S.A.-Poison Springs, although not a commercial discovery, is a credit to those explorers who push into forbidding wildcat territory. TGT's well (1) found 110 ft. of biohermal reef with excellent shows of oil, (2) found the Hermosa - Pennsylvanian to be sand contrasted to Aneth's Hermosa limestone, and (3) kindled a swift follow-up wildcatting program in the northwest part of the basin that may be the forerunner of a new oil province.

Oil-hunting in the Rockies

. . . maintained its steady successful clip with Wyoming, Montana, and the Las Animas arch emerging as top wildcat tales for 1958 and leading contenders for interest spots in '59.

Wyoming's two hot spots appear to be the Powder River basin and the complex north side of the Wind River basin. Pan American Petroleum Corp. and True Oil Co. both added Pennsylvanian discoveries to the already heated deep campaign on Powder River's northeast side. Two oil strikes at Lost Cabin by The California Co. point up the unsung potential of the Tertiary rocks on the mixed-up north side of Wind River basin.

Montana's skittish Disturbed belt (the southeast extension of Alberta's famed Foothills gas giant) should see action as a result of Blackleaf field's confirmation by Northern Natural Gas Producing Co. The Teton County field, first producer in the belt, now has two Mississippian gas wells.

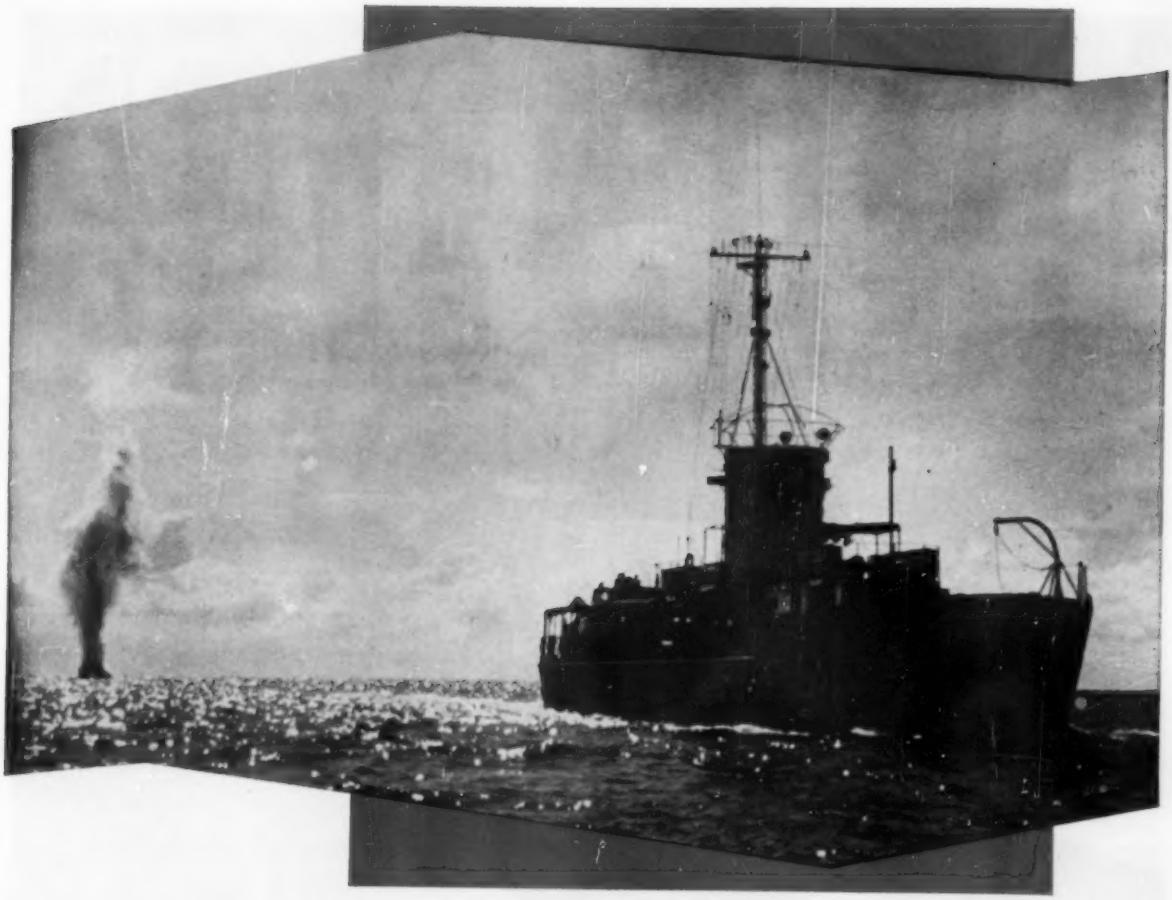
The Central Montana plains may stage an oil comeback because of new oil production from the Amsden at a Rosebud County wildcat. Honolulu Oil Corp.'s discovery fired a flurry of offsets. This is the first real action here since Wolf Springs.

The Pennsylvanian hike into the northwestern Kansas portion of Las Animas country moved into Cheyenne County where R. G. Lawton found Lansing-Kansas City oil 35 miles northwest of Llanos field, birthplace of this youthful province. This wildcat plus new tests in Kit Carson County, Colorado, will be the springboard for a spirited move into Las Animas arch territory in 1959.

Far-flung discoveries

. . . in Arkansas, Mississippi, and northwestern Oklahoma rounded out one of the best year-end drilling sprees in some time. A deep gas-condensate strike in southwestern Arkansas by Coulston Drilling Co. was that state's best hit of 1958. The East Kress City field discovery flowed 48,000 M.c.f. of gas per day plus distillate . . . Sandy Hook in Marion County joined the rapidly growing list of South Mississippi fields with production from Lower Cretaceous rocks . . . New luster was added to Oklahoma's Arbuckle North Buffalo field in Harper County with a triple-zone discovery by Sinclair Oil & Gas Co. at 1 Kuhn. Production was more than 1,000 bbl. per day from three Pennsylvanian zones, making it Oklahoma's discovery of the year.

John C. McCaslin



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TOLEDO 1, OHIO

Montana drilling takes giant step

A SLOW YEAR in Montana appears to have come to a roaring finish with the best strike since Wolf Springs on the Central Plains. Honolulu Oil Corp. reported a prolific oil flow at its 1-11 Stensvad in NE SE 11-11n-31e, Rosebud County.

This Tyler sand discovery (Pennsylvanian-Heath) flowed at the daily rate of 1,116 bbl. from perforations at 5,308-80 ft. Location is 1½ miles northwest of Sumatra field.

Honolulu with McAlester Fuel Corp. and Pan American Petroleum Corp. have offsets going.

Michigan wildcat set for completion

MICHIGAN'S hottest wildcat should have production test in objective Trenton horizon before the end of the year.

Mask and McClure 1 Rosenau, NW NW SW 23-3s-4w, Calhoun County, bottomed at 4,324 ft., and cemented liner to total depth.

Trenton section, topped at 3,899 ft., carried gas from 3,952 to 4,080 ft. and had oil saturation from 4,080 to 4,235 ft.

Operators plan to perforate from 4,170-90 ft. for primary production test. Well carried gas and oil in Trenton at 4,085 ft. before fishing job delayed drilling progress for 20 days.

Wells drilling in four Illinois fields

FOUR COUNTIES in Illinois' part of the Illinois basin figured in last week's exploration news. In Wayne County, 5 miles south of Mount Erie, Wausae Petroleum Co. and Calvert Drilling Co. 1 Ollie Cunninggam, NW NW SE 8-1s-9e, pumped 6 bbl. of oil per hour on test of the Rosiclare at 3,332-36 and 3,349-52 and 3,363-69 ft.

North of Burnt Prairie in the same county, Alva C. Davis 1 Winzenburger, NE NE NW 18-3s-9e, pumped 110 bbl. of oil per day from Rosiclare at 3,384-91 ft.

In Marion County, R. H. Troop has an indicated Benoist-Bethel sand discovery. The 1 Nattier-Langenfeld Unit, NE NE SW 5-3n-1e, 1 mile south of Patoka, had good drill-stem tests. The operator will test at 1,447-72 ft.

In White County, 1 mile west of Crossville, Coy Oil Co. is completing the 1 S. A. Goodman in 22-4s-10e. This Aux Vases discovery had good recovery at 3,020-27 ft.

In Christian County, 4 miles northeast of Edinburg, Pat Gentile has set casing for a look at Silurian at 1,919-31 ft. in 1 Williams, NW SE NE 4-14n-2w. The operator cored 12 ft. of saturated zone.

Texas' Shep field gets new pay

A SECOND PRODUCER and two new pay zones have been assured for the Shep (Gray) sand field of Taylor County, Texas. TXL Oil Corp. 1-A Eugene G. Crayton, Section 19, Block 461, W. S. Henry Survey, flowed 15 bbl. of oil in 5 hours on drill-stem test of the Caddo limestone.

The flow was through 15/64-in. choke, from perforations at 5,434-46 ft. Flowing pressure ranged from 150-400 psi.

The well also indicated oil production in the Gray sand when it unloaded oil following a drill-stem test at 5,310-64 ft.

An earlier test of the Fry sand at 4,705-54 ft. had gas in 9 minutes and flowing oil in 1 hour and 50 minutes. The flow into pits was not estimated.

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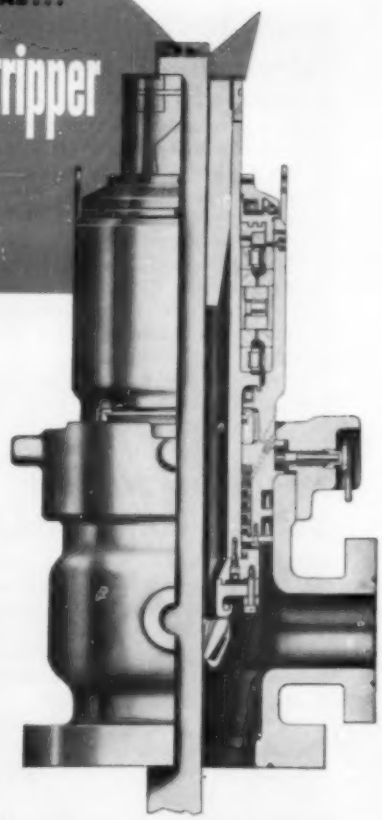


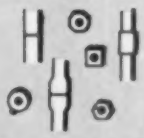
WHENEVER you're drilling in unknown formations—or in troublesome zones where pressures are a problem—make sure you install the unequalled protection you get with the Shaffer Rotating Blowout Preventer and Stripper.

HERE'S a unit that maintains *continuous* pressure control as long as the drill string is in the hole—whether the string is rotating, is being raised or lowered, or remains stationary. Since pressure control is continuous, emergencies can't happen too fast for this unit, because it is *always* sealed off around the drill string until the string is removed from the well. Note the many unusual features as outlined below...

PRESSURE SEAL IS CONTINUOUS—not only while running the varying shapes of the drill string in and out of the hole, but also during rotation and while pipe is stationary. Moreover, the sealing unit automatically adjusts itself to maintain its seal. No manual operations are necessary!

PROTECTIVE STEEL BARRIER of flexible latches protects the Stripper Rubber against damage as varying shapes and diameters pass through the unit. This flexible steel barrier also protects the Rubber from extruding under high well pressures!

Note space-saving compactness. Even flow-line connections are built-in, eliminating need for spools.



SEALS VARYING DIAMETERS AND SHAPES because the Stripper Rubber *automatically* expands and contracts to maintain a pressure-tight seal around the elements in the drill string—the varying diameters of flush, upset and coupled pipe, drill collars, subs, etc. . . . and any shape kelly, whether square, hexagon or octagon!

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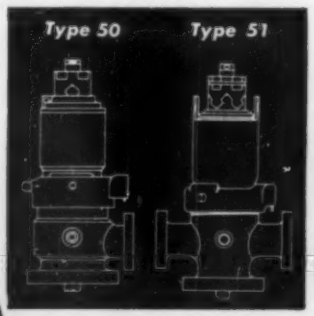

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Oklahoma counties make news

McClain

SOUTH CENTRAL Oklahoma's Newcastle area reports an impressive oil discovery at Gulf Oil Corp. 1 Bass, SW NE 36-9n-4w, McClain County. This well, west of Norman, flowed 20 bbl. of oil per hour and 3 M.M.c.f. of gas on 17/64-in. choke from Tulip Creek-Ordovician perforations at 10,-236-44 ft.; this flow was then cut to 260 bbl. in 21 hours on 10/64-in. choke.

Alfalfa

TWO prolific oil wells were added to West Mendon field in northern Oklahoma's Alfalfa County. J. M. Huber Corp. completed 2 Kirkpatrick in C SW SW 13-28n-10w flowing at the daily rate of 711 bbl. from Cherokee - Pennsylvanian at 4,930-42 ft.

Continental Oil Co. 1 Starne in C SE NW 23-28n-10w flowed 216 bbl. daily on 20/64-in. choke from Cherokee.

Creek

THE old Kellyville area of northeastern Oklahoma's Creek County got a big well last week.

Wilcox Oil Co. completed 3 Stanley in SE SW SE 15-18n-10e as a north extension to North Kellyville District for 600 bbl. per day on 28/64-in. choke from perforations at 2,138-47 ft. in Pennsylvanian sand.

Ellis

A NEW-PAY DISCOVERY is indicated for Ellis County in northwestern Oklahoma. Odessa Natural Gas Co. recovered oil from the Cottage Grove-Layton sand at 1 Potter in C SE NW 12-19n-22w.

Recovery on a 1-hour drill-stem test at 7,980 to 8,011 ft. was 7,900 ft. of gas in the pipe, 40 ft. of free 37.5°-gravity oil and 160 ft. heavily oil and gas-cut mud.

Ellis County has six producing fields—all gas—all producing from Morrow-Pennsylvanian. The Cottage Grove is also Pennsylvanian. This indicated strike is far to the south of the other pools in the county.

Cimarron

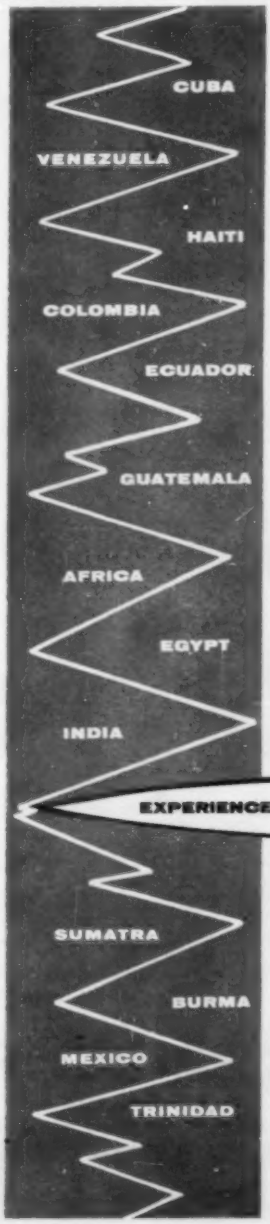
THE FAR NORTHWEST CORNER of Oklahoma apparently has another new pool to the west of previous production. J. S. Abercrombie 1 Twining in C SE SE 28-5n-7eCM, Cimarron County wildcat, is testing the Atoka-basal Pennsylvanian after finding gas in the Keyes-Pennsylvanian sand.

This test, west of Keyes field, made 5,140 M.c.f.d. of gas after treatment from perforations at 4,824-34 ft. An upper zone at 4,126-61 ft. made 3,120 M.c.f.d. It will be tested before dual completion. Other than a new oil pool one township west, this is the westernmost production in Oklahoma; it is the westernmost gas pool. Geologically, the new pool opener lies in the northern portion of the Dalhart basin and on the west edge of the Keyes dome.

Montana pool is called Hawk Creek

MONTANA'S new Amsden field in Musselshell County has been labeled Hawk Creek. Miles Jackson completed the 1 NP-McConnell in C Lot 24, 1-8n-29e, for 70 bbl. of oil daily from perforations in the Amsden at 7,079-99 and 7,111-33 ft.

This new discovery is 10½ miles southeast of Delphia field and 15 miles northwest of Wolf Springs field in the Bull Mountain syncline area.



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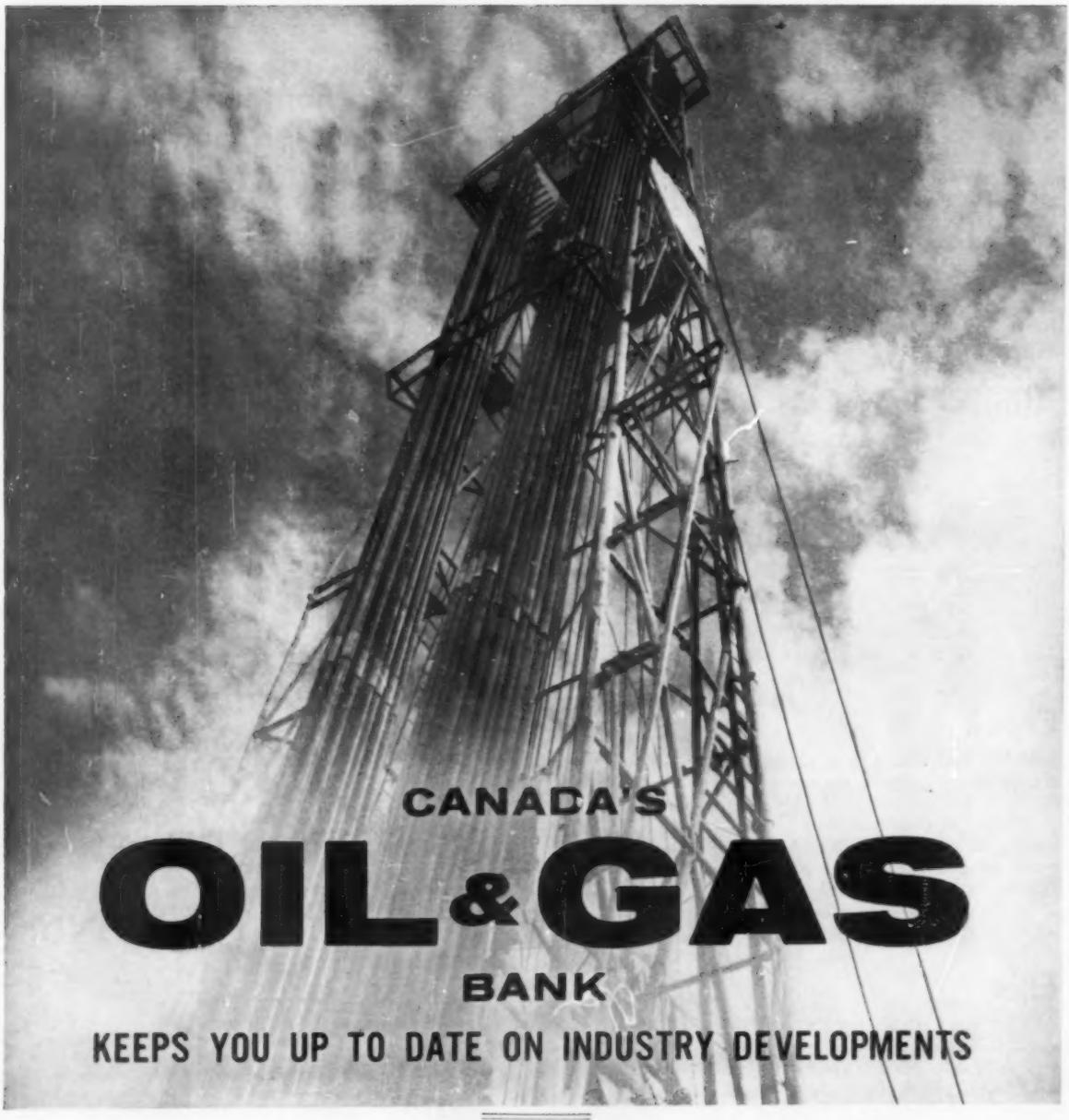

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Gas wildcats set for big 1959 California play

CALIFORNIA WILDCATTERS will enter 1959 with a number of interesting projects on the books. The last weeks of December brought out a rash of site announcements, mostly involving gas wildcats in North and Central California.

With the crude marketing situation still in bad shape, operators are turning more and more to gas prospecting. Included among the more interesting wildcats slated to greet the new year are these:

... **Western Gulf Oil Co.** will drill a wildcat gas test 10 miles east of Lodi in Central California's San Joaquin County. The Western Gulf wildcat, 1 Breitenbucher, will look for gas in SE SE 10-3n-8e. The nearest natural gas production is in the Lodi gas field 8 miles northwest of th drill site.

... **The Texas Co.** plans a 6,200-ft. gas wildcat 3 miles south of the Pleasant Creek gas field in Solano County. Drill site will be in SE NE 32-8n-1w, about 30 miles due west of the state capital, Sacramento. Texaco has tested this general area before having abandoned a 5,523-ft. dry hole last spring 2½ miles southwest of their new wildcat.

... **Beach, Church and Bell,** operators, will drill a wildcat 4 miles northeast of the nearest producer in the Dudley Ridge Gas Field of Kings County. The drill site is staked in NE NW 35-22s-20e. This is in the Tulare Lake basin.

... **William H. Hudson** has staked location for 1 Sorenson, a wildcat 5 miles northwest of Arbuckle in Colusa County. Nearest production is 6 miles south at the Arbuckle gas field. The operator just abandoned a 7,013-ft. gas test early in December located 3½ miles northwest of Arbuckle field.

... **Mohawk Petroleum Corp.** will join Standard Oil Co. of California and the Porter Sesnon-Great Basins Petroleum Co. in the search for additional production in Vernalis gas field of San Joaquin County. The first Mohawk test, 62-21 Basolo-Hunter, will be drilled 1 mile west of the Sesnon-Great Basins 33-22 Well completed for 11,000 M.c.f. as a new pool discovery in October. Mohawk has 370 acres west of the Sesnon-Great Basins Giambastiani lease and 240 acres directly north of the Basolo lease.

In California . . . Honolulu Oil Corp. gave the west extension of the "555" pool activity in Buena Vista Hills its second producer. Standard Oil Co. of California at the same time gave the pool its most southerly producer.

The Honolulu well, 11 Calidon in SE SE 19-31s-23e, flowed at a rate of 1,080 bbl. daily of 27.4°-gravity on a 1½-hour formation test of the interval 5,569-5,620 ft. This well is located about ¼ mile south of Honolulu's first west extension well, ½ mile west of the main area.

The Standard well, 29B-521, in NW NW 29-31s-23e, was completed in the "555" sand for 434 bbl. through a 14/64-in. choke. This well is on the southwest edge of the main area.

A second Honolulu test currently under way, located less than ¼ mile west of the nearest west extension producer, flowed gas and condensate at a rate of 6,355 M.c.f.d. on a formation test at 4,703-40 ft. On another test of an interval at 4,773-

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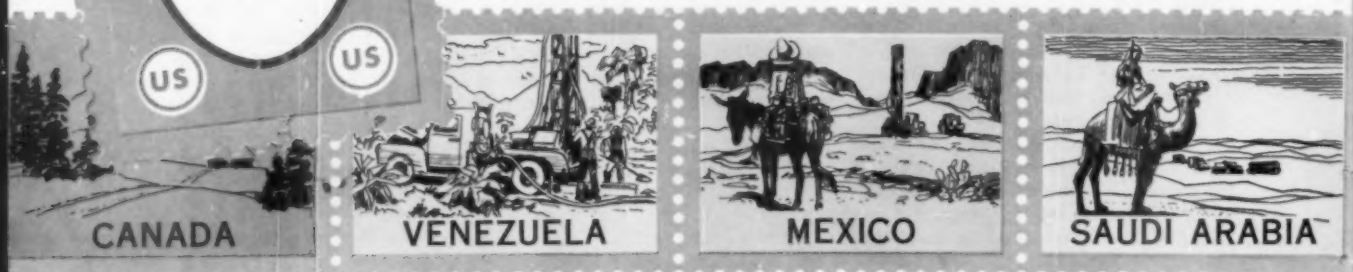

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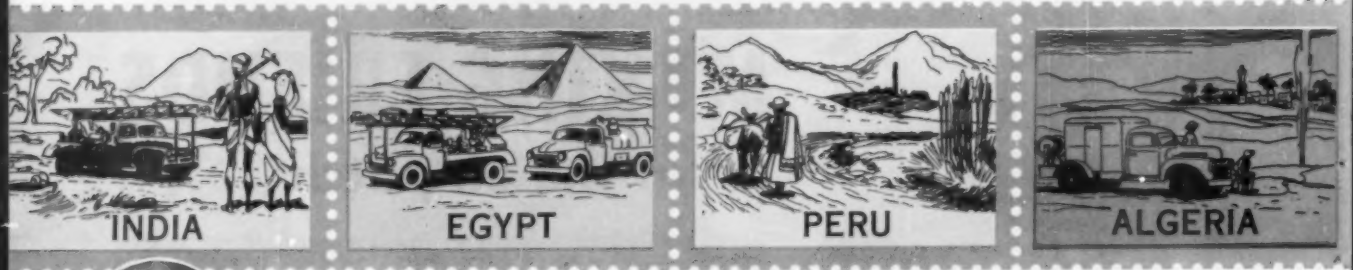

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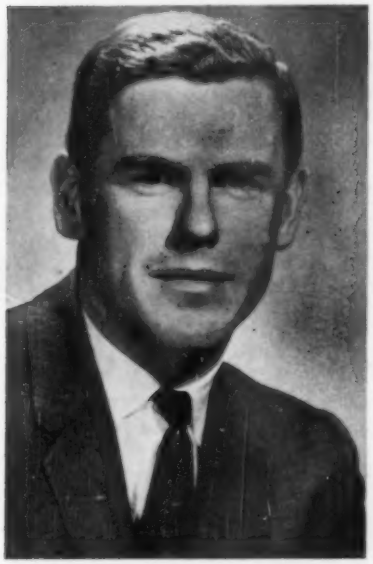


Dr. E. W. Best

Triad Oil Co. Ltd. announces the appointment of Dr. E. W. Best as Chief Geologist of the Company, effective December 1st, 1958.

Dr. Best, a native of Windsor, Ontario, received his early academic training at the University of Western Ontario and graduated with a B.Sc. in Geology in 1949. He continued to post-graduate studies at the University of Wisconsin where he received a Ph.D. in Geology in 1953.

From 1947 to 1952 Dr. Best took part in various surface geological mapping assignments in Newfoundland, Ontario and Alberta. He joined Ohio Oil Company as Geologist in 1953 and has been employed by Triad since 1955. His experience with Triad has included wide and varied activities in surface and sub-surface geological investigations.

In March 1958 Dr. Best became Assistant Chief Geologist and has been Acting Chief Geologist since August 1958.

4,820 ft., it flowed 6,732 M.c.f.d. rate with condensate mist. Neither test had a fluid rise.

In addition to those three tests, Tidewater Oil Co. was drilling two wells in the pool area, Richfield Oil Corp. was drilling one and was getting ready to start up two others and Standard of California was moving in equipment to start two more.

Colorado extension is dual producer

AN EXTENSION WELL to Lamb field in Morgan County, Denver basin, Colorado, flowed both oil and gas from the Dakota "J" and "D" sands. The new producer is Arrowhead Exploration Co. and Delta Drilling Co.'s 4 State in S½ SE NE 16-3n-58w.

A drill-stem test in the "D" sand at 5,698-5,704 ft. flowed 1,800 M.c.f.d. Oil flowed on this test. A test of the "J" sand at 5,762-68 ft. also got oil and gas.

Location of the extension is ¼ mile north of the discovery well of the field, a 1956 strike. That well, Arrowhead and Delta 2 State, C SE SE 16-3n-58w, made 3 M.M.c.f.d. from the "D" sand. The first oil producer in the field is W. C. McBride and H. L. M. Drilling Co.'s 1 Snodgrass in C NW NW 15-3n-58w.

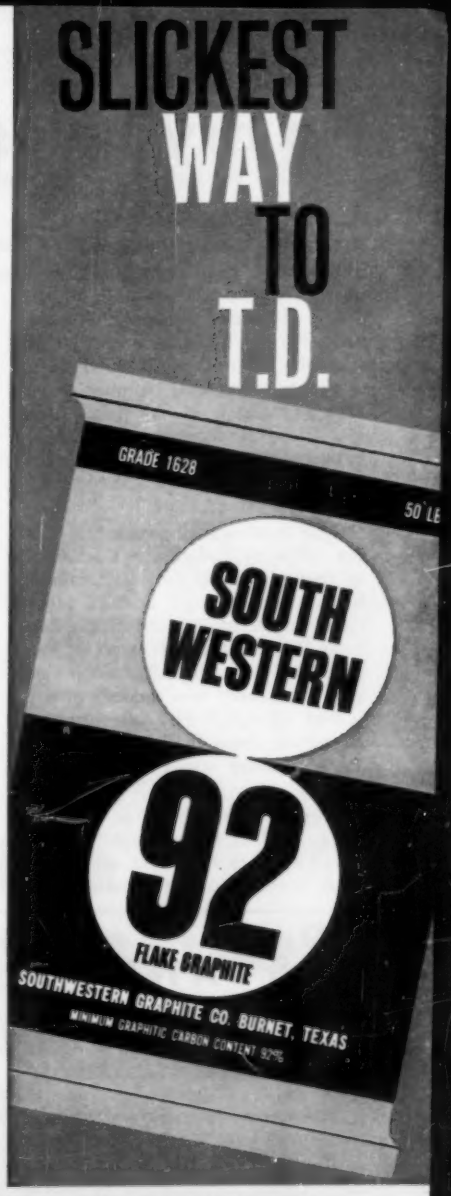
Colorado field adds two gassers

WESTERN COLORADO'S Divide Creek gas field added two gas producers last week. This Garfield County field was moved 3 miles to the northwest with completion of Sun Oil Co.'s 5 Divide Creek Unit in NE NE SW 10-8s-91w, and the 6 Divide Creek Unit in SW NE SE 4-8s-91w.

The first well made 3,600 M.c.f.d. of gas from upper and lower zones of the Mesaverde on ½-in. choke from perforations at 5,974-6,016 ft. and 4,734 and 5,204 ft. The No. 6 well made 3,337 M.c.f.d. of gas on ½-in. choke from Mesaverde at 4,086-4,100 ft.

Ohio's New Guilford gets east extension

An east extension to the field at New Guilford in Perry Township, Coshocton County, Ohio, made an initial 128 bbl. per day after fracture. Clinton sand in the producer, Preston Oil 1 Walter Clark, Section 4, had a good showing natural at 3,274-3,324 ft.



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No dry holes for Glady field, West Virginia

GLADY FIELD, West Virginia, was turned into line December 1, 1958.

This field is located on the Blackwater anticline and extends approximately 13 miles long and one well wide. No dry holes have been drilled; thus, the boundaries of the field are unknown at present. Number of tests drilled to date is 21. All were producers. These 21 completions average at a potential of 7,586 M.c.f.d. and a combined total of 159,320 M.c.f.d. at completion stage.

This field was discovered in October 1954 by Columbian Carbon Co. as they drilled U.S.A. 71, stake 47, located in Dry Fork District, Horton Quadrangle, 15,750 ft. south of latitude 38° 50′, 6,150 ft. west of longitude 79° 40′, eastern Randolph County. A discovery was finaled for a potential of 1,525 M.c.f.d. through 3-in. tubing, from Oriskany Sand Stone. Rock pressure was 1,950 psi. in 144 hours.

Hope Natural Gas Co. of Clarksburg, W. Va., have completed a total of 6 wells in this field and Columbian Carbon Co. of Charleston, W. Va., have completed a total of 15 wells. Columbian is currently drilling two wells in this field. United Fuel Gas Co. of Charleston, W. Va., is currently drilling one well. Of the 21 tests, 14 were drilled, completed, and turned into lines by February 7, 1958. Field was then shut in May 1, 1958, due to lack of marketing facilities. Total gas feed into line for the 3-month period totaled 5,615,192 M.c.f.

GLADY FIELD in Randolph and Pocahontas counties, West Virginia. This shut-in gas field was turned into line December 1.

Texas' Coleman adds Gardner oil

GARDNER PRODUCTION was opened in the Southwest Novice field of Coleman County at W. W. F. Oil Co. 4 Celya Parker, 2½ miles southwest of the town of Novice. Completion potential was 52.7 bbl. of 41° oil a day through 12/64-in. choke, from pay at 3,671-79 ft. Gas-oil ratio was 1,280:1. Top of the Gardner sand was 3,668 ft., on elevation of 2,006 ft.

Location is in Section 26, Block 2, T&NO Survey. Production has been assigned to the Coleman County regular field for proration purposes.

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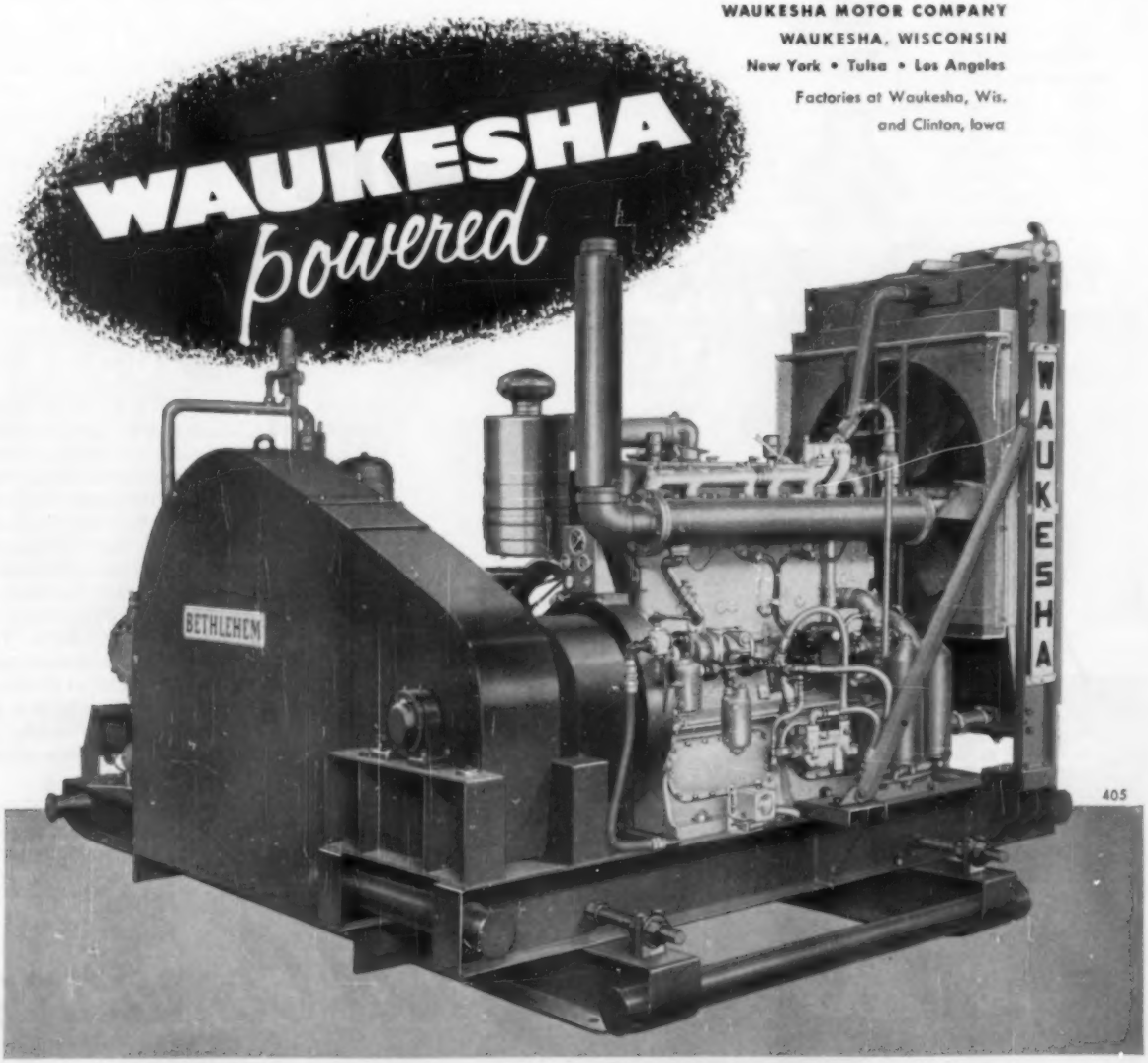

East Texas reaps 13-well harvest

EAST TEXAS exploration last week was bolstered with 13 new wildcats spread over 9 counties.

Woodbine sand was the most popular objective, with nine of the total slated toward that formation. Two wells were scheduled to test the Rodessa, one to the Paluxy and one to the Wilcox. By counties, they were:

Anderson County . . . Coats Drilling Co., Gladewater, was below 3,210 ft. at its 1 O. L. Lively, 9½ miles southwest of Elkhart in the southwestern portion of the county. It is a Woodbine test, to 6,500 ft. Location is on an 80-acre tract in S. C. Box Survey, A-11. A Mustang Drilling Co. rig has contract.

Nearest Woodbine production to 1 Lively is Elkhart field, 2½ miles to the northeast. Nearest subsurface control is furnished by Coats Drilling 1 Whitchurch, 1½ miles to the southwest, which was dry at 5,993 ft. Shell Oil Co. holds acreage in the immediate area of the test and was said to be furnishing dry-hole money.

Shell Oil 1 Raymond Kyle, proposed Woodbine test 3½ miles northeast of Elkhart field, was waiting on a B & B Drilling Co. rig last week. Projected depth is 5,800 ft. Location is in the E. Aston Survey, A-99.

W. H. Bryant and Associates, Tyler, were waiting on a Globe Drilling Co. rig to drill 1 T. L. Lassiter to 5,800 ft. in search of the Woodbine. Proposed test is 5½ miles northwest of Slocum in southern Anderson County, in the R. M. Howell Survey, A-401.

Bryant and Associates have drilled two other Woodbine wildcats in the same area, both of which were reported to have had oil shows.

In southwestern Anderson County, Sam B. King and Three States Natural Gas Co. was drilling below 3,000 ft. at their 1 Collier-Clark Unit. Scheduled depth was 5,450 ft. Travis Ward Drilling Co. has contract. Location, in C. C. Stibbens Survey, A-714, is 6 miles southwest of Palestine and ½ mile southeast of Woodbine production in Lone Lake field.

Cherokee County . . . Operators were rigging up at two Woodbine wildcats, scheduled for immediate drilling.

W. C. Perryman, Athens, 1 E. Houghton is 3½ miles northeast of Summerfield, in the Isaac Kendrick Survey, A-29. Production will be sought to 4,300 ft. Hayden Farmer Drilling Co., Olney, holds contract. Nearest Woodbine production is in Stone field, 4 miles to the northeast.

The county's other test is Loyce Phillips 1 A. L. Looney, slated to 4,600 ft. The project is 4 miles northeast of Mt. Selman, and ½ mile northeast of production in Mt. Selman field. Location falls in the T. W. H. McCall Survey, A-602. Jordan Drilling Co., Kilgore, has contract.

Freestone County. . . One of the two Rodessa projects in East Texas is Thomas W. Clay 1 W. G. Smith, an 8,200-ft. test approximately 10 miles northeast of Fairfield. Drill site is in the J. R. Youree Survey, A-671. Wise Drilling Co., Tyler, has contract.

The well is on a block of 2,800 acres held by the operator, and on acreage farmed out from Standard Oil Co. of Texas. The Texas Co. is supporting the venture.

Houston County . . . John B. Moore, independent operator, Longview, was expected to start operations last week at 1 D. C. Lawson, a 3,400-ft. test to the Wilcox section.

The well is ½ mile south of Love-

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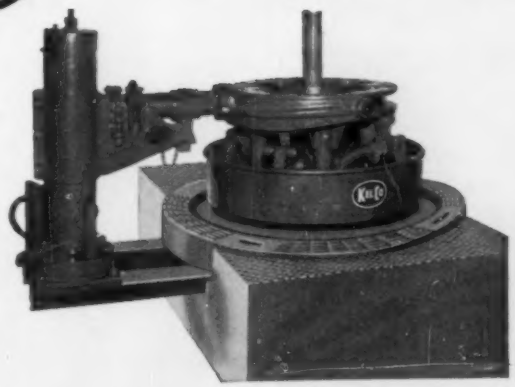

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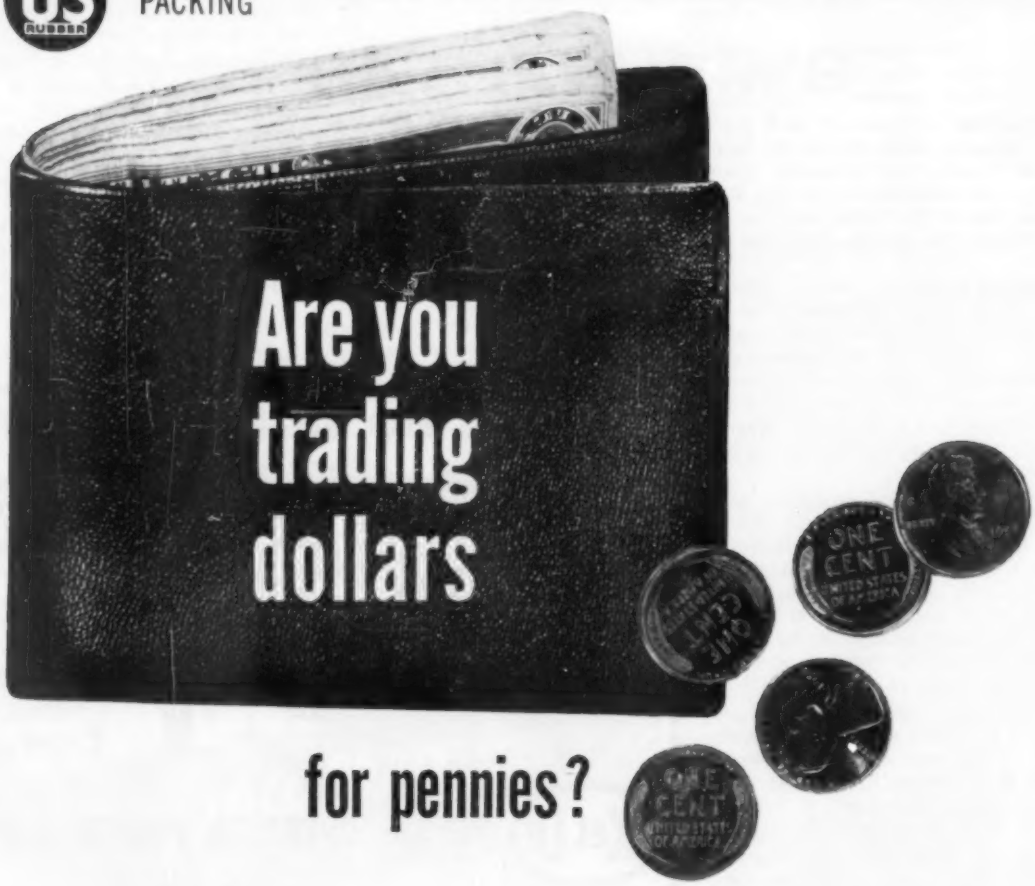

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lady, in the J. R. Hartt Survey, A-517.

Kaufman County . . . The lone operation scheduled for this county last week was Heimen Brothers 1 Will & Etta Freeman. It is a 5,000-ft. Paluxy project, to be drilled on a 49-acre tract in the Cyrena Kenneda Survey, A-263. Location is about 1 mile northwest of Kemp. Starting date was not reported.

Navarro County . . . Mib Shaw and Carter Gabriel, Tyler, have started work at 1 W. C. Perryman, 4,400-ft. Woodbine wildcat 10 miles southeast of Kerens. Location is in the James Smith Survey, A-741. Nearest production is from the Rodessa and Pettet formations, in Northwest Cayuga field, 2 miles to the east in Henderson County. Gibson Drilling Co., Kilgore, has contract.

Rusk County . . . N. P. Powell, Tyler, was moving in rig last week for a north offset to the discovery and only producer in Dottie Sue field. Location for this semiwildcat is in the John Elliott Survey, 1½ miles south of Rusk. Projected depth was 5,300 ft., with a Gibson Drilling Co. rig.

The field was opened by Bobby Manziel 1 Faye Harris Mason, which made a small Woodbine pumper in sand at 5,084-90 ft. Offsets have been dry to the southeast, east and west.

Titus County . . . American Petrofina Co. of Texas has staked location for a 7,200-ft. Rodessa wildcat 5 miles northeast of Talco. Location is on a 160-acre tract in the J. P. Wilson Survey, A-629.

The deep test is 3 miles southeast of Rodessa and Paluxy production in Christmas Day field, and slightly more than 1 mile north of Paluxy production in Talco field.

Wood County . . . The Whiffen Estate, Tyler, has staked location for a Woodbine test approximately 1 mile west of Mineola. The proposed test is 1 Robert G. Dreslin. Projected depth of 5,700 ft. is expected to penetrate the Woodbine, as well as the sub-Clarksville.

Location is on a 123-acre tract in J. F. Dowell Survey, A-162. The well is a southwest extension attempt to sub-Clarksville production in Nolan Edwards field.

Confirmation wells highlight Paradox action

Paradox basin developments include staking of new wildcats and confirmation wells.

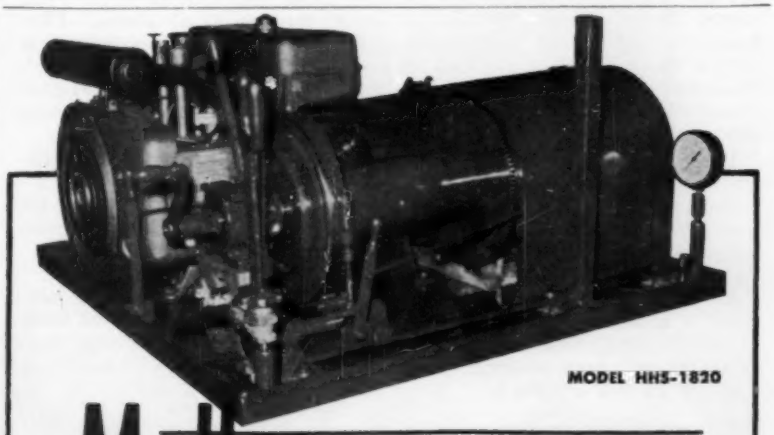
Shell Oil Co. located 44-20 Unit in NW SE SE 20-40s-23e, San Juan County, Utah, and will go to 5,500 ft. to attempt confirmation to the Recapture Creek discovery. The Pennsylvanian try is ½ mile west of the field discovery well (completed in 1956 at 1 Recapture Creek in C SE SW 21-40s-23e, making 34 bbl. of oil in 2 hours from Hermosa at 5,354-75 ft.).

Other tests . . . Carter Oil Co. will drill two wildcats in southeastern Utah. The 5 Navajo-115, W½ SE SE 30-41s-25e, San Juan County, will look for production in the Paradox-Pennsylvanian at 5,700 ft. It is about 1 mile south of McElmo Creek field production.

Another well is the 2 Navajo-117, NE NE NE 7-42s-25e, San Juan County. This one is also a Paradox test, 3 miles southeast of White Mesa field production. There are dry holes 1 mile northwest and 1 mile southwest.

Well in Wyoming tests deep sands

WYOMING'S current deep test, G. L. Reasor 1 Government at Pacific Creek, is running pipe to total depth



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of 13,313 ft. Reasor will perforate and test uphole in intervals below 9,000 ft. to total depth.

No tops have been reported, nor have any cores or drill-stem tests been made. This Pacific Creek wildcat is northwest of the one-time world's deep hole at Superior Oil Co. 1 Unit, Sublette County, Green River basin. That well went to 20,521 ft. 10 years ago.

New field opens in Texas' Newton

A NEW FIELD is being opened by Sunray Mid-Continent Oil Co. in South Central Newton County, southeastern Texas. Its discovery well, 1 Hankamer, is 7½ miles northwest of Deweyville, and 2 miles southeast of Dolly field, nearest production.

Daily flow of 135 bbl. of 46.4°-gravity oil through 11/64-in. choke is credited to the well from a Yegua sand at 8,970-80 ft. Gas-oil ratio is 915 cu. ft. per bbl., and flowing pressure 550 psi.

Completion also is expected to be made in a shallower zone, perforated at 8,696-8,702 ft. Productivity of this zone has not been reported. Total depth of the well is 9,004 ft.

Here's drilling action in southern Louisiana's Lafayette Parish . . .

A NEW discovery well in South Louisiana's Lafayette Parish is being completed with exceptionally rich gas-condensate flows from two deep sands.

The well, 1 Saul Sonnier, is a joint exploratory venture of J. P. Owen, Columbian Carbon Co., and Tidewater Oil Co. It is 6 miles northwest of Lafayette in the prolifically productive tricorner area of Lafayette, Acadia, and St. Landry parishes.

Completion flow rates of the well's two sands total more than 1,000 bbl. daily through small chokes. Flow from the lower zone, perforated at 12,856-86 ft., is 565 bbl. of 44.5°-gravity condensate and 3,440 M.c.f.d. through 12/64-in. choke. Its flowing pressure is 5,900 psi.

The upper zone, perforated at 12,557-83 ft., tested 476 bbl. of 47.2°-gravity condensate and 2,270 M.c.f.d. through 10/64-in. choke with pressure of 6,150 psi.

Total depth is 13,586 ft.

Location, in 12-9s-3e, is 1½ miles north of the same group's previously completed oil-discovery well, 1 Mayer, now designated as Ossum field. The latter is productive at 12,987-13,012 ft. The new discovery well is being named "North Ossum." It is 2½ miles east of the developing South Bosco field, and 3 miles southeast of the older Bosco field. A wide area around the three-parish corner.

. . . and St. Mary

COMPLETION of another deep well in Lake Palourde field, in South Louisiana's St. Mary Parish, confirms a discovery made more than a year ago.

The new well, drilled by William T. Burton Industries on State Lease 3137, is southwest of Burton's discovery well, on State Lease 2833. Both wells produce gas and condensate from a 14,700-ft. sand. Burton now is drilling on his third well, located northwest of the discovery well on the same state lease.

Pay zone of the second well is perforated at 14,745-58 ft. in hole drilled to 15,338 ft. This is the fourth sidetracked hole in the well, which has been drilling since July, 1957. The well flowed at the rate of 102 bbl.

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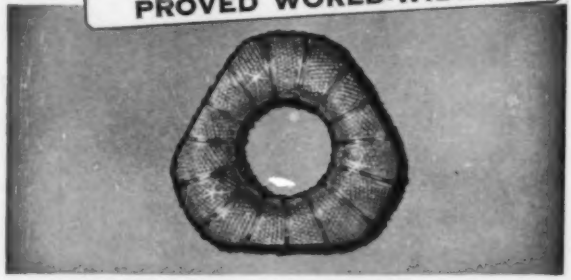

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of 55.7°-gravity condensate and 2,400 M.c.f.d. of gas through 12/64-in. choke. Flowing pressure was 3,800 psi.

Discovery well was drilled to 17,772 ft. Its pay is perforated at 14,744-65 ft., from which it flowed 2,238 M.c.f. of gas and 61 bbl. of 49°-gravity condensate per day through 11/64-in. choke.

All wells are in Lake Palourde, northeast of Morgan City. They are 4 miles southeast of Simon Pass field, on the north side of the lake, and about 6 miles southwest of the older East Lake Palourde filed, in Assumption Parish.

WILDCAT HILLS is the newest addition to the chain of big Mississippian gas fields along Alberta's Foothills front.

New field joins Alberta chain

ALBERTA'S Foothills gas belt gained another big pool-opener. Imperial Oil, Ltd.'s, Wildcat Hills discovery, 9 miles northwest of Jumping Pound field, flowed 20 M.M.c.f.d. of gas after treatment of perforations in the Mississippian at 10,581 to 10,607 ft. and 10,660 to 10,766 ft. Flow was on ¾-in. choke.

Location of Wildcat Hills is on LSD 6, 35-27-6w5 along the general trend of Foothills gas belt fields.

East Kentucky has new deep test

Another deep test for the eastern Kentucky area is under way as United Fuel Gas Co. makes hole below 830 ft. on 1 J. W. James, a wildcat on Coldwater Fork about 1 mile southeast of Inez, county seat of Martin County.

Well is designed to test all formations to granite and is being drilled with heavy rotary tools.

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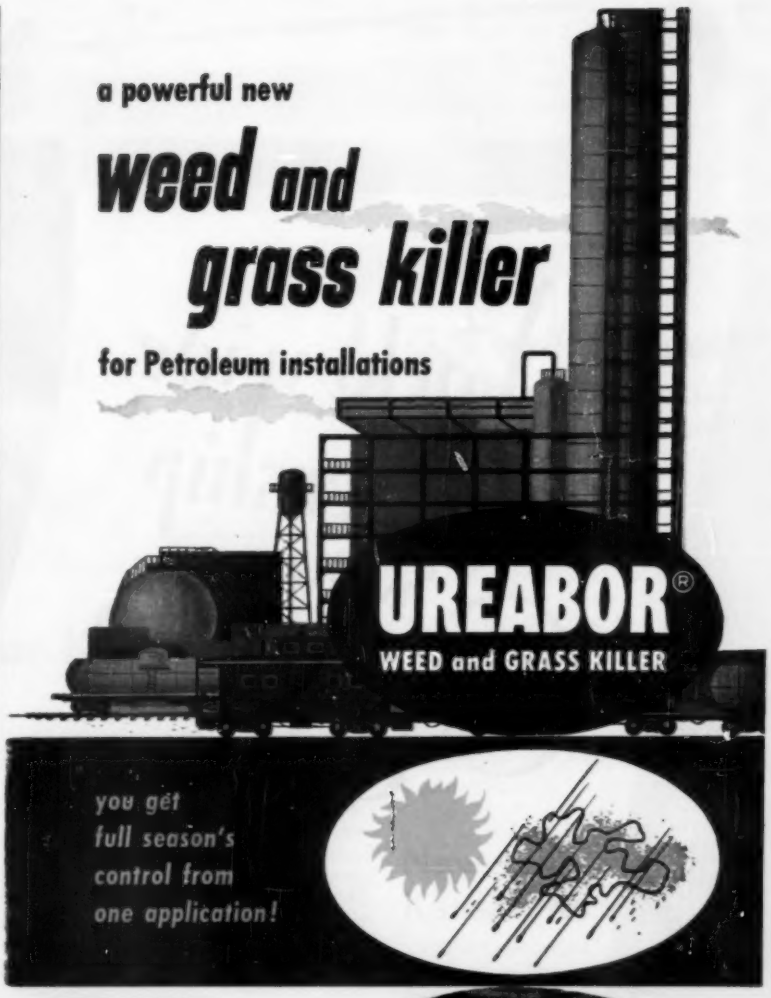

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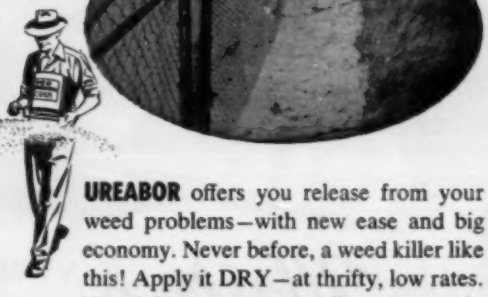

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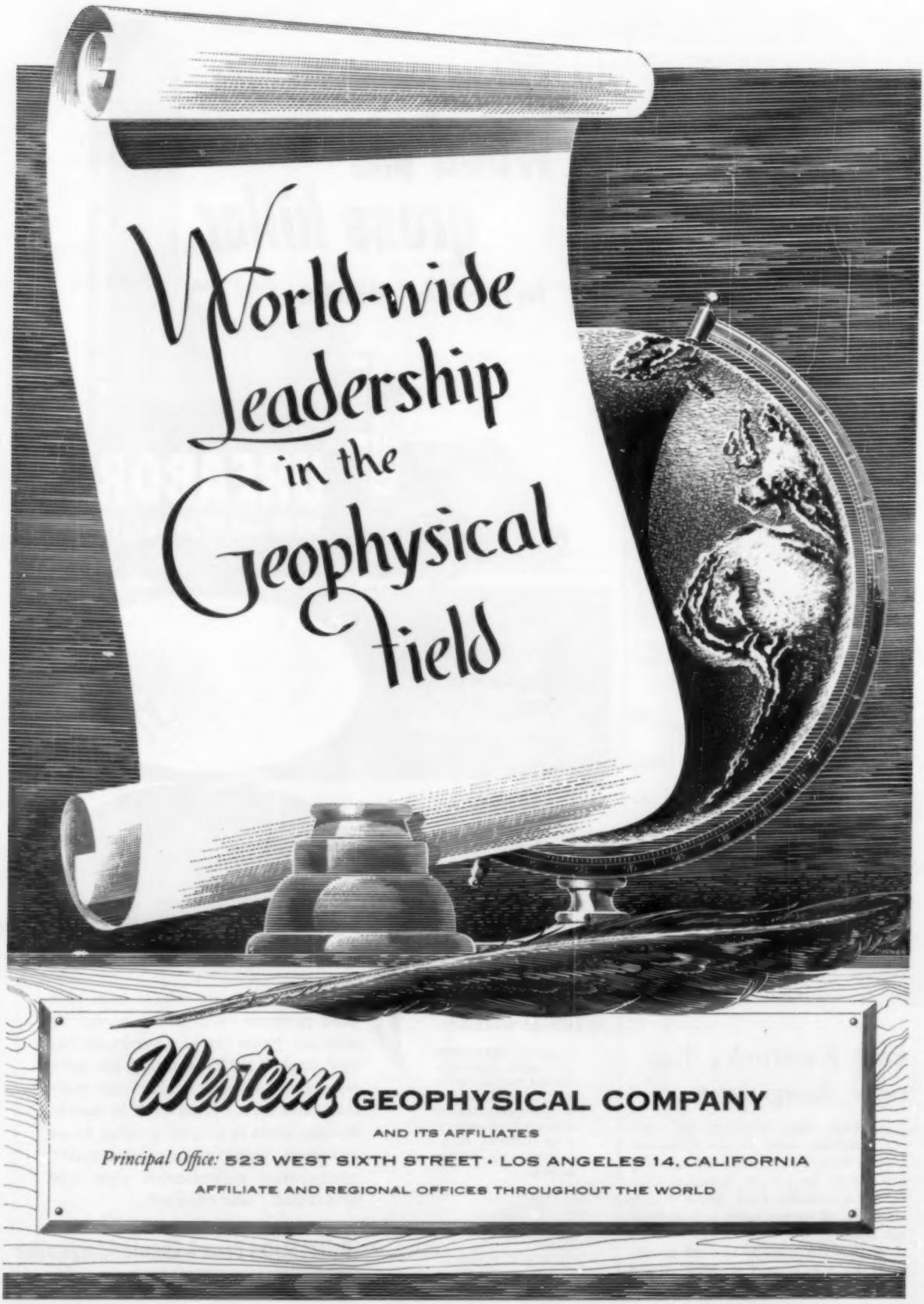

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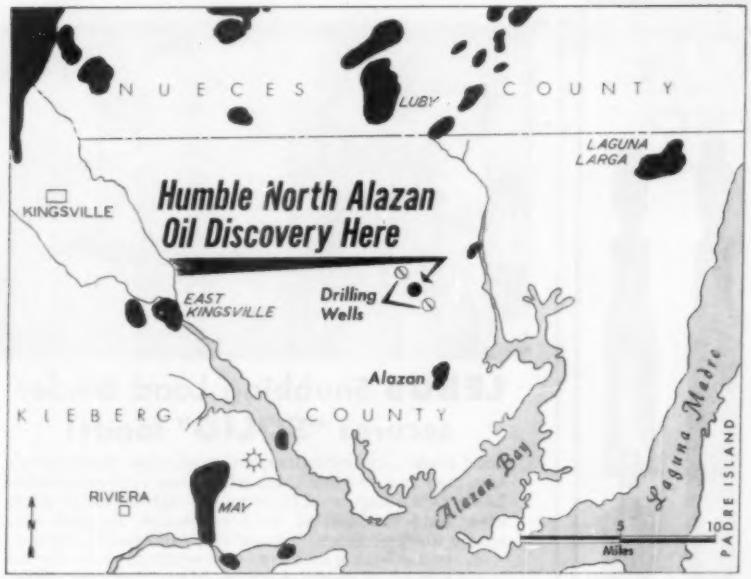

Another field for King ranch

DISCOVERY of another oil field on its expansive King ranch properties in Kleberg County, in Texas' lower coastal region, is reported by Humble Oil & Refining Co.

Its discovery well, 6 King Ranch Alazan, is 5 miles from nearest production. The latter is a gas-condensate well drilled by Humble in 1954 and designated a Alazan field.

Humble refers to its new discovery as North Alazan, and already is drilling two more wells to confirm the discovery. One is 6,000 ft. southeast and the other 6,000 ft. northwest of the new well.

Completion of the initial well is in two Frio zones. The lower zone, perforated at 7,220-30 ft., is productive of 39.4°-gravity oil, testing 281.19 bbl. per day through ⅞-in. choke. The upper zone, perforated at 7,080-90 ft., is a gas-condensate reservoir.

Hole has been drilled to 8,915 ft.

Location is 18 miles southeast of Kingsville.

Sheffield channel wildcats completed

TWO DEEP WILDCATS in the western portion of Sheffield channel in Pecos County, West Texas, have been officially completed.

Phillips Petroleum Co. 1 Harral "A," long-testing deep exploration 5 miles northwest of Puckett field, rated a daily potential of 53 M.M.c.f. of gas from the Wolfcamp pay at 14,580-14,670 ft. Top of the Wolfcamp was logged at 7,723 ft. Operators drilled and tested to 19,020 ft., total depth.

Location of the well is Section 6, Block 126, T&STL Survey, 15 miles southeast of Fort Stockton.

Hunt Oil Co. has completed its second test on the Elsinore ranch in southwestern Pecos County, 17 miles southwest of the big Puckett gas field.

No. 53 Elsinore Royalty Co. was completed for a calculated open-flow potential of 5,200 M.c.f.d. of gas from perforations in the Devonian at 11,946-12,046 ft., after heavy acid treatments. Total depth was 12,295 ft.

The confirmation well is approximately 1 mile south of 52 Elsinore, the field discovery. Location is Section 24, Block D, GC&SF Survey.

Dual discovery in Garza County

GARZA COUNTY, on the northeastern flank of Midland basin in West Texas, gained a new Permian pool and dual discovery.

Wilson Exploration Co., Fort Worth, 1 Connell Estate pumped 101 bbl. of 36° oil a day from San Andres perforations at 2,984-90 ft., and 51 bbl. of 31.8° oil a day from the Glorieta at 3,052-60 ft.

No. 1 Connell is about 9 miles southeast of Post, and 3½ miles southwest of Post field. Location is in Section 65, Block 5, GH&H Survey.

Shell Oil Co. 1-G Slaughter, Ellenburger prospect in southern Garza County, swabbed 49 bbl. of oil in 3½ hours from perforations at 8,330-46 ft. Testing continued. Tops logged were: San Andres 2,460 ft., Spraberry 5,030 ft., Pennsylvanian 7,814 ft., and the Ellenburger at 8,329 ft.

Location is in Section 3, A-1162, about 2 miles south of Happy field.

Gas well prospect in Concho County

CENTRAL CONCHO COUNTY was in line for a Strawn gas producer at Hovgard & Fitzgerald 1 Bertha L. Cave, 10 miles northwest of Eden.

Gas production from the Strawn limestone was indicated on a 15-minute drill-stem test at 3,495-3,509 ft. Gas surfaced in 45 seconds and flowed at the estimated rate of 6 M.M.c.f.d. Flowing pressure was 430 psi. Shut-in pressure read 1,425 psi.

A 1-hour test in the Canyon sand at 3,104-14 ft. recovered 60 ft. of slightly oil and gas-cut mud.

Location is in Section 296, Carl Lehman Survey.

New oil find for Kansas' McPherson

McPHERSON COUNTY in Kansas has a new oil discovery. It is Brunson-Spines, Inc., 1 Forman in NE SE SE 34-18-2w, 1½ miles north of Ritz-Canton field and 1 mile east of new Larson field. The well swabbed 2 bbl. per hour from Mississippian chat.

Other Kansas news included a big producer in Kingman County. Cities Service Oil Co. finaled the 1 Conrardy in NW NW NE 1-31s-9w, in Spivey-Grab field, for an indicated drawdown capacity of 3,520 bbl. per day from the Mississippian. Perforations were at 4,422-45 ft.

Alberta's Kinakin has Gilwood pay

GILWOOD sand production is indicated at a wildcat in the Kinakin area, 16 miles southeast of new Morse River Beaverhill Lake Middle Devonian field in Central West Alberta.

Imperial Oil, Ltd., reportedly found light-gravity oil on test of the 10-29-639 Kinakin at 8,315-35 ft. This sand is the equivalent of Granite wash.

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Figs. 400P, 600P, 700P, 800P

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Standard Size, Figs. 400T, 500T

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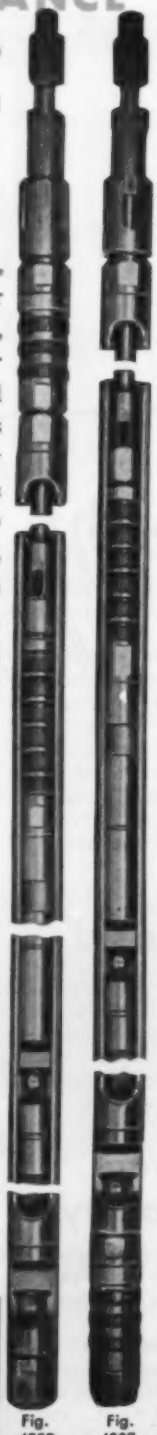

Fig. 400P 600P 700P 800P — Fig. 400T 500T

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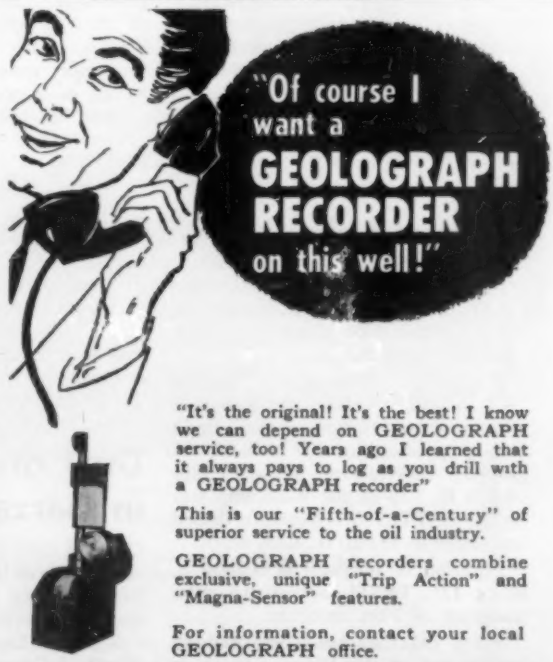

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November service, condensate-well depth breakdown

	SERVICE WELLS					FIELD-WELL CONDENSATE							WILDCAT COND.		
	A	B	C	D	E	C	D	E	F	G	H	I	E	F	G
Arkansas	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
California	2	2	1	7	2	...	...	...	...	...	...	...	...	...	...
Illinois	14	33	5	...	...	...	...	...	...	...	...	...	...	...	...
Kansas	...	2	6	3	...	...	...	...	...	...	...	...	...	...	...
Kentucky	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Louisiana	...	1	4	...	...	...	...	...	4	5	9	6	...	...	1
South	...	1	4	...	...	...	...	...	1	3	8	6	...	...	1
Offshore	...	...	...	...	...	...	...	...	3	2	1	...	...	...	...
New York	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...
Ohio	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Oklahoma	1	7	8	1	1	...	...	4	2	...	...	...	...	...	...
Pennsylvania	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...
Texas	9	10	11	...	2	2	5	16	15	10	...	...	1	1	3
Dist. 1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...
Dist. 2	...	...	...	...	...	...	...	4	3	1	...	...	...	1	...
Dist. 3	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...
Dist. 4	...	1	2	...	...	...	...	4	3	1	...	...	1	...	2
East	...	...	...	...	...	...	3	4	4	...	...	...	...	...	...
Dist. 7-B	1	...	...	...	...	...	2	...	...	...	...	...	...	...	...
West	...	4	6	...	...	...	...	2	...	4	...	...	...	...	...
Dist. 9	7	4	3	...	2	2	...	1	...	...	...	...	...	...	...
Dist. 10	...	1	...	...	...	...	...	1	5	...	...	...	...	...	1
West Virginia	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Mississippi	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...
New Mexico	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Colorado	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Total United States	**29**	**83**	**37**	**11**	**5**	**2**	**6**	**22**	**21**	**15**	**9**	**6**	**2**	**1**	**4**

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

N.D. confirmation well looks good

THE CONFIRMATION to North Dakota's new Sherwood field in Renville County appears to be a better well than the discovery. Exploration Drilling & Oil Co. 1 Flem, C NW NE 3-163n-85w, got 4,056 ft. of free oil on a test at 4,146-76 ft. in the Mission Canyon-Mississippian.

This confirmation strike is the northeast and first offset to Gulf Oil Corp.'s discovery which made 245 bbl. of oil and 10 bbl. of water from Mission Canyon at 4,204-20 ft. Location of the field is just south of the Canadian border and 2 miles northwest of Sherwood, N. D.

Nebraska field is confirmed

NEBRASKA'S Barrett field in Banner County was confirmed at Pan American Petroleum Corp. 1 Barrett-D, C NW SE 33-17n-56w. Pump gage is 270 bbl. per day with production from the Dakota "J" sand at 6,670-82 ft.

This confirmation well is south of the discovery of the Denver basin field. Brinkerhoff Drilling Co. 1 Barrett, SE SW NE 33-17n-56w, opened the field with 277 bbl. per day on pump from "J" sand at 6,671-81 ft. There are two other wells active in the field, the 3 and 1 Barrett-E. Locations have been announced for 1-F Barrett and 2 Barrett-D.

Successful Wildcats

WESTERN CANADA

British Columbia: Triad J-29-D Beatton River, 29-J-94-H-2. Triassic oil discovery. TD 3,800 ft.

Alberta: Shell - Petrol - Explorer 12-9-63-25 Simon, LSD 12, 9-63-25w5. D3 oil discovery. TD 11,620 ft.

Imperial 1-33 Cork, LSD 1, 33-58-11w4. Colony sand gas discovery. TD 3,477 ft.

Richfield-Banff 13-19-44-16 Daysland, LSD 13, 10-44-16w4. Blairmore gas discovery. TD 4,800 ft.

Pan American-Imperial 14-31-84-12 Floral, LSD 14, 31-84-12w6. Stoddart gas discovery. TD 9,487 ft.

CALIFORNIA

Sacramento County: Brazos Oil & Gas Co. 1 "SR Unit 1," NW SW 17-4n-4e, 2,800 M.c.f.d., ¼-in. choke, 2,030 lb. TP, perfs. 5,456-72 ft., TD 10,902 ft. (New Lopes sand gas pool discovery at River Island field.)

EAST TEXAS

Red River County: Payne - Johnston and Happy Gist 2 William Stephens estate, P. D. Midkiff Sur., 4 miles north of Bagwell. IPP 9 BOPD, 28°, Paluxy 1,621-28 ft. TD 1,628 ft.

NORTH TEXAS

Wise County: Christie, Mitchell & Mitchell 1 L. C. Nabord Gas Unit, A. Robinson Sur., A-706, 5 miles southeast of Bridgeport. IP 120 BOPD, 40°, GOR 420:1, pay 3,506-26 ft. TD 6,027 ft., elev. 715 ft. Oil pay in Boonsville gas field.

WEST CENTRAL TEXAS

Brown County: Lee Ratner 1 Ball, A. R. Clark Sur., 9 miles southwest of Brownwood. IP 500 M.c.f. gas., Marble Falls 1,336-54 ft. TD 1,490 ft. shut in.

Lee Ratner 1 Ernest Sikes, J. Luther Sur. 166, 4 miles north of Indian Creek. IP 1,200 M.c.f. gas, Marble Falls, 1,228-50 ft. TD 1,395 ft. Shut in.

Fisher County: A. Pollard Simons 1 D. W. Stephens, 78-1-H&TC Sur., 2 miles north of Royston. IP 2,500 M.c.f. gas, Canyon pay 4,318-34 ft. TD 4,500 ft. Old well reworked into gas discovery.

Stonewall County: Fletcher Oil & Gas Drilling Corp. 1 A. B. Kempton, A. Slaydon Sur. 57, 2½ miles east of Woodward Conglomerate field. IPP 30 BOPD, 38°, conglomerate 5,815-25 ft. TD 5,871 ft., elev. 1,524 ft.

Perkins-Prothro Co. 1 N. Hamrick, Sec. 139, BBB&C Sur., 20 miles southeast of Aspermont, 1½ miles east of Carol Ann (Upper Tannehill) field. IPP 137 BOPD, 35, GOR 150:1, Tannehill 2,651-57 ft. TD 3,500 ft., elev. 1,776 ft.

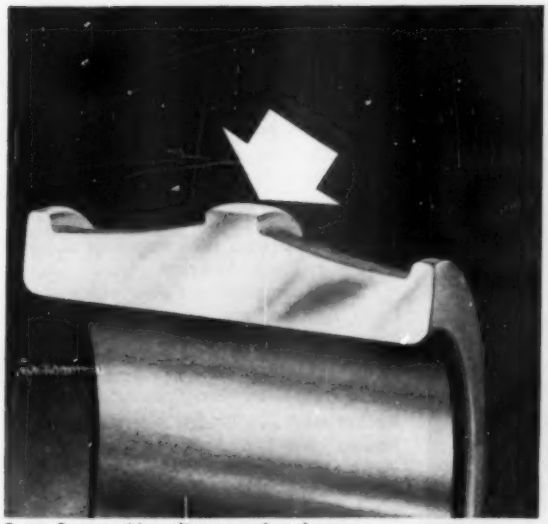
WEST TEXAS

Motley County: Pan American Petroleum Corp. 1 O. E. Birnie, Sec. 1, Blk. GP, C&MRR Sur., 4 miles west of Whiteflat. IP calculated open flow 1,150 M.c.f. gas, upper Strawn 8,527-30 ft. TD 10,010 ft., PB 9,086 ft., elev. 2,592 ft. Old well reworked.

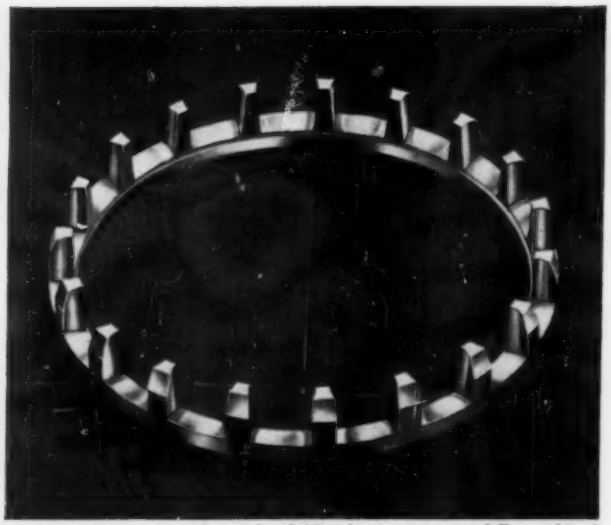
November field-well depth breakdown

	OIL WELLS									GAS WELLS									DRY HOLES								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
Alabama							4																				
Arkansas		20	8	2	2									4						4	13		1				
California	4	9	11	6	5	3	6	1	1			1	2	2						4	2	1	1	1	1		
Colorado				1	3							1	2	4									14				
Illinois	15	30	68							5	1								8	21	49	1					
Indiana	3	24	3							1									7	20							
Kansas		39	90	53	8							3	12	6						18	75	42	3				
Kentucky	152	38	4							2	4								12	27	4						
Louisiana	6	30	14	4	12	25	22	12	3	1	11	4	1	4	2	1	1		1	6	21	9	15	10	9	8	3
North	5	25	12	2	4					1	11	4	1	3	1				1	5	19	6	13	3			
South	1	5	2	2	7	16	19	9	3					1		1	1			1	2	3	2	7	9	7	3
Offshore					1	9	3	3							1											1	
Michigan		7	5	1																1	9						
Mississippi				1	4	1	5	4														5	2		2		
Montana		2	4			2														3			2	1			
Nebraska				1	17																		18				
New Mexico	1	20	21	20	17	6	3	1			10	19	11	12	2					3	2	4	2	1	1		
West	1	11	4	1	9						9	18	10	12	1					2		2					
East		9	17	19	8	6	3	1			1	1	1		1					1	2	2	2	1	1		
New York		21										1															
North Dakota			7		1	4	3														1		2	2			
Ohio	4		31							5	6	12							7	6	10						
Oklahoma	42	80	59	23	19	15					1	5	1	15					31	28	27	13	17	9			
Pennsylvania	2	8										18		6						3							
Texas	96	197	307	149	147	59	17	5		2	17	17	9	11	2	1			50	91	46	50	53	20	3		
Dist. 1	8	9	6	2											1	1			1	7	1	1		1			
Dist. 2			4		4	4					1	2	1							1	1	6	1	4			
Dist. 3	1	3	3	4	9	10	2			2		1	1	1					5	2	5	3	5	9	1		
Dist. 4		5			5	1					1		2						4	7	1	4	6	3			
East	10	7	15	3	18	8													3	1	2	5	8	1	1		
Dist. 7-B	31	36	16	21	15						2	2	3						25	24	15	7	10				
West	5	23	185	94	78	29	15	5				1	2	1						7	6	11	11	2	1		
Dist. 9	41	109	25	25	14	1								9					12	42	11	10	10				
Dist. 10		5	53		4	6					13	11			1						4	3	2				
Utah					19							1	1	1					1		1	1	2				
West Virginia		5	2								28	10	13							9	4						
Wyoming	5	1	2	1	5	1					1	1		2	3				1	1			3				
Total United States	330	531	636	262	259	116	60	23	4	16	79	93	52	67	9	2	1		118	245	264	126	135	44	16	8	3
Western Canada		5	6	71	44	9	1				2	3	4	2	1	1			1	2	2	11	2	1			
Alberta			5	40	44	9	1				2	3	4	2	1	1			1		2	1	1	1			
Saskatchewan			1	31																		9	1				
Manitoba		5																		2							
British Columbia																						1					

NOTE: A = 0-1,250 ft.; B = 1,250-2,500 ft.; C = 2,500-3,750 ft.; D = 3,750-5,000 ft.; E = 5,000-7,500 ft.; F = 7,500-10,000 ft.; G = 10,000-12,500 ft.; H = 12,500-15,000 ft.; I = 15,000 ft.

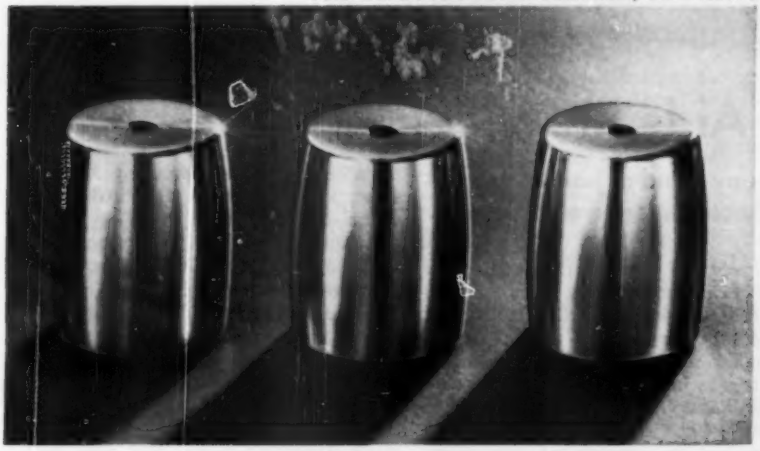


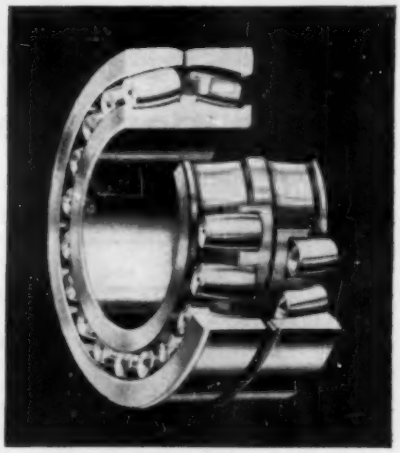
Center flange guides rollers to peak performance.



Land-riding bronze cages are fully machined.

Roller diameters are matched electronically within .0001".





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Latin Experience Aids Breene

. . . in post with independent company—and at home. He sees friendship as important between South America and the U.S.

IN SPITE of the rock and "spit" welcome extended Vice President Nixon in Caracas, Americans generally have good relations with Latin Americans.

And that relationship must continue. Latin American countries, while striving to become more independent, still need the U.S.—and the U.S. needs them. Thinking Latins realize that.

That comes from Ed Breene, 49, who spent 15 years in Latin America in various positions with International Petroleum Co. Breene retired from International last August to become executive vice president of Winona Oil & Gas Co. of Delaware, with offices in Tulsa.

Breene's service in South America and his knowledge of the people are coming in handy in his new position.

It was back in 1934 when Breene first went to Latin America, where some of the countries switched from dictators to attempts at democracy and back again in relative short periods of time.

Breene looks back and says he's convinced the countries "are becoming more mature, trying to seek their own destinies in their own way."

He thinks the people generally have a favorable impression of the United States, pointing out there is always a small element which is anti-U.S. He says this is no different from other countries of the world, which have anti-U.S. elements including not only communists but some people who "don't like the top dog." The bigness of the U.S. naturally fosters some enemies.

Contributing to the good relations are the American oil companies operating in Latin America.

"Large American oil companies in Latin America are sincere, trying to be good citizens and helping those countries every way they can," Breene says.

Background . . . Breene had no problem in choosing a career. His father was an independent oil operator, lawyer, and president of a bank in Oil City, Pa.

Both Ed and his brother, Jim, decided on oil careers. Jim is now president of Winona Oil & Gas.

Ed, 6 ft. tall, 190 pounds, and now greying at the temples, looks "at home" in the field or behind a desk. He's had experience at both.

He launched his career as a roustabout when he was 16. He later obtained a petroleum-engineering degree from the University of Pittsburgh school of mines.

Breene started his foreign service in 1934 as a petroleum engineer for International in Talara, Peru. He was assistant chief petroleum engineer there in 1939 when he resigned to enter the drilling business in Illinois. But his absence from South America didn't last long. He resigned as vice president and general manager of Mohawk Drilling Co. in 1942 and returned to Talara, again with International, as reservoir engineer.

He held various posts with International—including chief petroleum engineer and manager of the Talara operations—before being moved in 1948 to Toronto as assistant to the vice president in charge of produc-

▶ ▶ ▶ Personals

W. G. Christensen has been named assistant to the manager of joint venture operations for General Petroleum Corp.

J. C. Posgate, assistant division superintendent for Humble Oil & Refining Co. in New Orleans, has been named 1959 chairman of the Offshore Operators Committee. He succeeds **Al Glodt,** Gulf Oil Corp. **Rex Alford,** Continental Oil Co., has been named secretary.

Denver D. Short, assistant superintendent at Panhandle Eastern Pipe Line Co.'s Tuscola, Ill., station, has been transferred to Zionsville, Ind., as station superintendent. **James H. Budden, assistant superintendent at Montezuma, Ind.,** will succeed Short at Tuscola.

Dr. Harold D. McBride and **Dr. Eugene F. Lutz** have joined Ohio Oil Co.'s Littleton, Colo., research center as research chemists. **Dr. Philip W. Choquette** has joined Ohio at Littleton as research geologist.

Joel O. Hougen, A. E. Marshall, and **Milton Welhoelter** have been named technologists in the engineering department of Monsanto Chemical Co.'s St. Louis research and engineering division.

James Ryan Walker, formerly geophysical consultant in Shreveport, La., has joined Murphy Corp., in El Dorado, Ark., as staff geophysicist. A graduate of the University of Oklahoma, Walker was with National Geophysical Co. and Arkansas Fuel Oil Corp. before becoming a consultant.

tion. At that time, the company's executive offices were in Toronto.

Three years later Breene was back in Latin America, this time as manager of field operations for Tropical Oil Co., an International subsidiary, on the De Mares concession in Colombia.

He became manager just a month before the De Mares concession reverted to the Colombian Government at the expiration of a 30-year contract (OGJ, Aug. 23, p. 109). He recalls it was the first major concession to revert to a national government according to terms of a contract.

Breene remained there until 1952 in charge of the Barranca refinery and the technical advisory group Tropical set up to advise the Colombian Government on operation of the field.

After another 3-year hitch in the producing department of International's executive offices—which had been moved to Coral Gables, Fla.—it was back to South America. He was sent to Caracas as executive representative of International in Venezuela.

After 22 years with the company, Breen took early retirement to accept the position with Winona Oil. But he's continuing his interest and his ties with Latin America.

Breene is in charge of Winona Oil's operations, primarily in the waterflooding field. The company has acreage holdings in the Four Corners area, Wyoming, and Montana, a flood project about to get under way in Kentucky, and interests in Texas.

The company also has an interest in Forest Colombian Corp., a subsidiary of Forest Oil Corp., which has a contract to flood La Cira and Infantas fields of the De Mares concession.

Breene's foreign service also comes in handy at home. Breene, his wife, Lois, and their 10-year-old daughter, Virginia, all speak Spanish. That's a big help in giving instructions to their Mexican maid—who doesn't speak English.

Donald A. Hickson has joined California Research Corp.'s Richmond, Calif., laboratory as research chemist. **D. B. Benson, N. H. de Nevers,** and **Warren P. Seanab** have joined the Richmond laboratory as research engineers.

Samuel Baltzell, district foreman in Oakland, Neb., for Northern Natural Gas Co., has been transferred to Superior, Neb., in the same capacity. **Charles Gilkison,** Superior district foreman, will swap jobs with Baltzell in Oakland.

Gen. James H. Doolittle will retire January 1 as a vice president of Shell Oil Co. He will continue as a director, however. Doolittle will become board chairman of Space Technology Laboratories, Inglewood, Calif., after his retirement from Shell. Doolittle joined Shell in 1930 when he left active duty with the U. S. Army Air Corps to become manager of the company's aviation department. He has been vice president and a director since 1946. Well known for his aviation career, he was the first to fly across the U. S. in less than 24 hours and was a pioneer in "blind flying." During World War II he became famous as leader of the first flight on Tokyo in 1942 and as commanding general of Air Force units in North Africa, Italy, England, and Okinawa.

E. Dean B. Laudeman, geological engineer with Union Oil Co. of California, has been transferred to Bakersfield, Calif., from Santa Fe Springs, Calif.

John F. Partridge, Jr., Casper, Wyo., consulting geologist, has joined Ashmun & Hilliard, No. 3, Ltd., Midland, Tex., as head of the company's new Casper office. Partridge is a former district exploration superintendent for The California Co.

E. L. Green, Jr., and **Hugh Burdette** have been elected directors of Godfrey L. Cabot, Inc., Boston. Green is general manager of the company's oil, gas, and gasoline department and a vice president of Cabot Carbon Co. and Cabot Gasoline Corp. Burdette is general manager of Cabot's southwestern division and is a vice president of several Cabot subsidiaries.

OLEN LANE

Olen Lane, vice president of Continental Oil Co., has been elected president of Western Oil and Gas Association. He succeeds **S. F. Dooley,** vice president of Shell Oil Co. Other new officers of the association are **D. T. Staples,** Tidewater Oil Co., first vice president; **Howard C. Pyle,** Monterey Oil Co., second vice president; and **T. H. Wallace,** Western Gulf Oil Co., treasurer. **Felix Chappellet** has been reelected secretary, vice president, and general manager.

▶ ▶ ▶ Personals

Robert M. Lowe, division engineer with Sohio Petroleum Co., has been transferred to Houston from Billings, Mont.

G. C. K. Dunsterville is resigning as president of Cia. Shell de Venezuela, Ltd. He will step out of the post on June 30.

J. Robert Friday has been named assistant chemical engineer in the technical division of Humble Oil & Refining Co.'s Baytown, Tex., refinery

W. B. Macdonald, formerly geologist for Hudson's Bay Oil & Gas Co. in Edmonton, has joined Kern County Land Co.'s Canadian district as Calgary representative.

Sam H. Casey, vice president of Commonwealth Oil Refining Co., has been elected executive vice president. He will continue as head of the company's New York office. Headquarters of Commonwealth are in Ponce, Puerto Rico. Casey has been with Commonwealth since 1957. He entered the oil industry in 1942 with Sohio Pipe Line Co. He later was with Pan Am Southern Corp. and American Oil Co.

P. E. Patterson, foreman with General Petroleum Corp., has been transferred to the company's Wilmington, Calif., plant. He was formerly foreman at the Athens gasoline plant, Los Angeles.

H. J. Haynes has been elected vice president in charge of production for Richmond Exploration Co., Venezuelan subsidiary of Standard Oil Co. of California. A graduate of Texas A. & M. College, Haynes joined California Standard in 1947. He was transferred to Richmond Exploration in 1956. He will headquarter in Maracaibo.

Robert A. Pryde has been named drilling superintendent of R. L. Manning Co., Denver drilling contracting firm. Pryde has been with the company since its formation in 1950. He will headquarter in Casper, Wyo. **Ralph L. Brown** has been named assistant drilling superintendent. Brown will move to operating headquarters in Casper from Powell, Wyo.

SCHWEND

PADON

PHELPS

WHITE

REIDY

MILLER

Six Warren Petroleum Executives Are Promoted

WARREN PETROLEUM Corp. has increased the membership of its board of directors from 7 to 10 and has named 3 new vice presidents and a new senior vice president.

The new directors are Fred S. Schwend, who also has been promoted to senior vice president; William B. Padon, who is vice president in charge of projects and planning; and Rex V. Phelps, vice president of the terminal and transportation divisions.

Elevated to vice president are Kenneth T. White, James M. Reidy, and C. W. Miller.

Schwend, the new senior vice president, has been a vice president of several service departments and certain affiliated companies. He formerly was connected with the LPG division. Schwend joined Warren in 1946 after serving as production manager for Reconstruction Finance Corp.'s petroleum butadiene section.

White, a new vice president, will continue as general manager of the LPG division. He was manager of the Houston LPG district office and then sales manager before being named to his present post last year.

Reidy has been assistant vice president of the natural gasoline sales division. He has been in the division since 1939 and was division sales manager before becoming assistant vice president.

Miller will continue as general manager of the manufacturing division, a job he has held since the retirement of C. E. Wharton last June. Miller was general superintendent of Midland Gasoline Co.'s Conroe, Tex., plant before becoming assistant manager of Warren's manufacturing division in 1956.

C. M. Hinton, production manager of Oil Reserves Corp., and **J. P. Black,** exploration manager, have been elected vice presidents and members of the board of directors.

Whitney Stone, president of Stone & Webster, Inc., has been elected chairman of the board and chief executive officer. He succeeds **William T. Crawford,** who has resigned as chairman but will continue as a director. **Richard N. Benjamin,** president of Stone & Webster Service Corp., has been named president and a director of the parent company. Benjamin becomes chairman of the service company. **Peter J. Rempe,** senior vice president, succeeds Benjamin as president of Stone & Webster Service. The appointments are effective January 1.

G. E. Hathaway has been named division mechanical supervisor for the products-pipeline division of Sohio Pipe Line Co.'s transportation department. He has been on special assignment making a study of the department's maintenance program.

S. H. (Sid) Dewey has been named drilling superintendent in Guatemala for Brown Drilling Co. Dewey has been with Brown Drilling since 1949.

Dr. Richard R. Bloomer, consulting geologist and independent operator, has been elected 1959 president of the Abilene, Tex., Geological Society. Other officers are **Dorman N. Farmer,** Wayne Petroleum Co., vice president; **Eugene M. Peeples,** Humble Oil & Refining Co., secretary; and **Richard R. Church,** Magnolia Petroleum Co., treasurer.

▶ ▶ ▶ Deaths

Dennis Halepeska, 37, Abilene, Tex., consulting geologist, and **David F. Morris,** 60, Abilene independent operator, were killed in a December 17 gas-well accident near Cross Plains, Tex. A well valve was blown off the wellhead of the completed well.

Charles Thurston (Tut) Lee, 54, Long Beach and Huntington Beach, Calif., oil producer, died December 18 in an Orange, Calif., hospital after a heart attack.

Ralph G. (Pete) Garretson, 74, who retired from Baker Oil Tools, Inc., last year after over 50 years in the oil industry, died December 15 in Downey, Calif.

Frederick A. (Fritz) Utzerath, 69, superintendent with Edison Oil Co., died December 13 at his home in Bakersfield, Calif. Utzerath had been with Edison since 1936.

William John Hollingsworth, 65, owner of William J. Hollingsworth Oil Well Service Co., died December 13 at his home in Bakersfield, Calif.

J. D. Vasentine, 61, service manager for Pacific Tubular Service Co., died December 10 in Los Angeles.

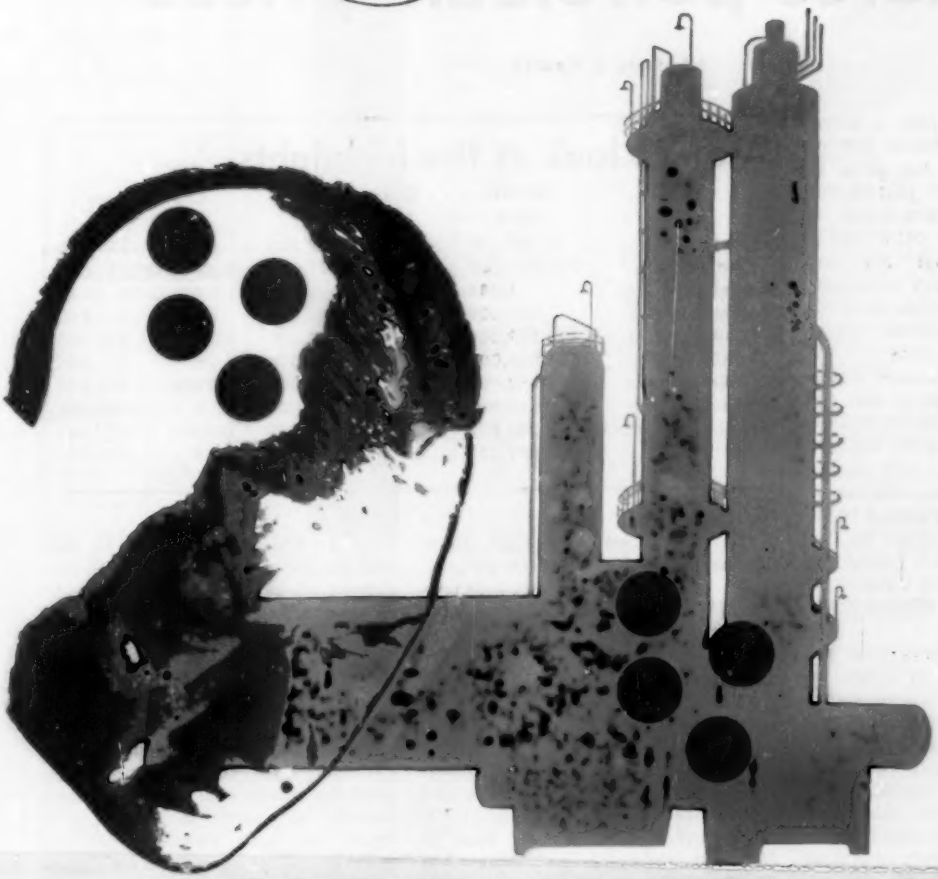
Sheldon W. Tyer, 69, Ardmore, Okla., oil producer, died December 15 in a Temple, Tex., hospital.

Edwin J. Hamilton, 58, Tulsa independent operator, died December 20 in a Tulsa hospital. Hamilton operated leases in Kansas, Oklahoma, Texas, Mississippi, Colorado, and Montana.

Victor Cotner, 65, former vice president and a director of Columbian Carbon Co., died recently in a St. Petersburg, Fla., hospital. A graduate of Montana State College, Cotner was chief geologist of Columbian Carbon for many years.

James A. DeLong, Shawnee, Okla., independent operator, died recently in Shawnee. DeLong was with Amerada Petroleum Corp. before becoming an independent.

intangibles were never so **important**



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WORLD-WIDE CONSTRUCTION FOR THE PETROLEUM, PETROCHEMICAL, AND CHEMICAL INDUSTRIES

Gas dilutes petroleum prices

BY JOHN C. CASPER

NATURAL GAS will play a more important role in the future energy picture than it has in the past. It has moved up from a bit part in the early thirties to a position equal to that held by bituminous coal in 1957.

Natural-gas production did not reach 10% of total energy consumption until 1934. Its portion in 1957 was 25% of the total with the largest gains reported in recent years.

There are several indicators which point to still further gains for gas compared with other fuels. First, total energy in proved gas reserves exceeds the total for crude. The API reserve committee estimated crude reserves at 30.0 billion barrels at the end of 1957. The corresponding committee for the American Gas Association placed gas reserves at 246.6 trillion cubic feet, equivalent to about 45.7 billion barrels of crude.

These figures show that proved gas energy exceeds energy in crude by about 50%.

For the 3-year period 1955-57, gross additions to the gas supply, including discoveries, extensions, and revisions, had a crude equivalent of 12.4 billion barrels. Crude added during the same period amounted to 8.3 billion barrels. Even with operators concentrating on the search for oil, they found more gas than crude.

All of these trends point to larger percentage gains by natural gas than by crude for the years ahead.

A quick look at the highlights . . .

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	7,107,550	DOWN	4,525	UP	170,758
Crude stocks	258,719,000	UP	1,691,000	DOWN	20,491,000
Completions	1,086	DOWN	141	DOWN	41
Refinery runs	7,822,000	UP	34,000	UP	110,000
Gasoline stocks	178,599,000	UP	3,893,000	DOWN	10,887,000
Kerosine stocks	27,936,000	DOWN	1,711,000	UP	217,000
Distillate stocks	138,182,000	DOWN	9,905,000	DOWN	14,201,000
Residual stocks	60,668,000	DOWN	2,148,000	UP	2,994,000
Four-product stocks	405,385,000	DOWN	9,871,000	DOWN	21,877,000
Total imports	1,907,100	UP	297,600	UP	393,700

The charts on this page show changes since 1936 for both gas and crude. The first graph gives comparisons for production and price. Gas production in 1936 was equivalent to about 36.5% of crude production for the year. The ratio had climbed to 83% of crude production for 1958.

On the other hand, average gas prices for 1958 were down compared with crude. The volume of gas equivalent in energy to a barrel of crude sold this year for about 64 cents, or 21.4% of the average crude price. Back in 1936, the average gas price was 27.6% of the crude price.

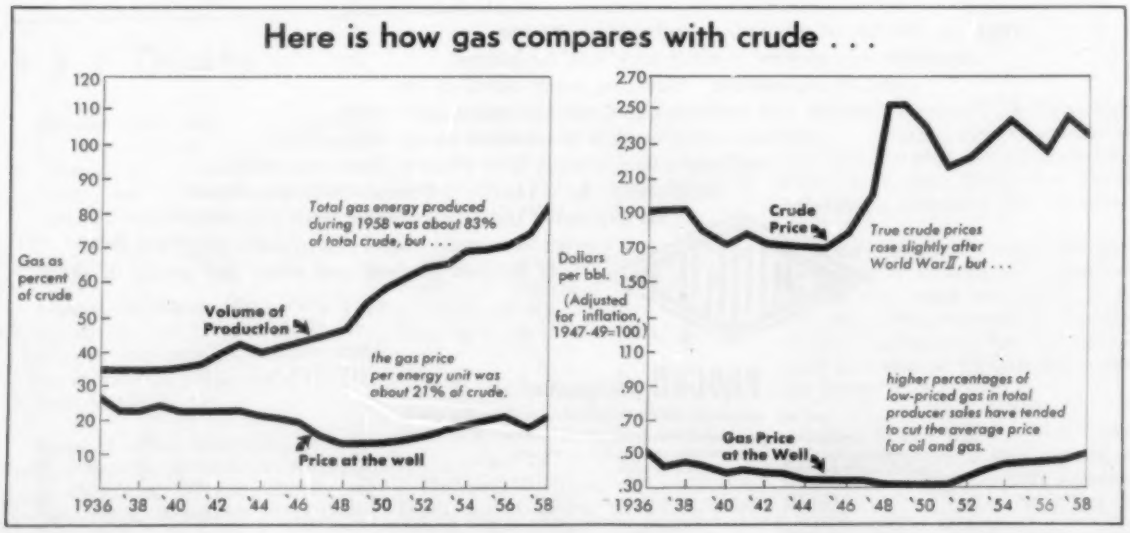
The second chart shows average prices for both gas and crude, corrected for inflation. Note that the true crude price has been up since soon after the end of World War II. Natural-gas prices, corrected for inflation, showed no gain until after 1950 and still were below the 1936 level in 1958.

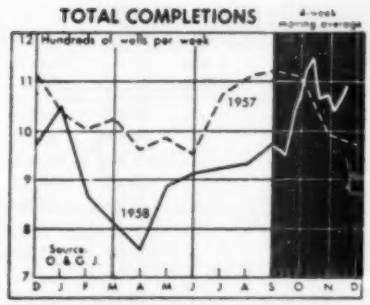
There is every reason to believe that gas sales will continue to grow faster than oil. Operators may produce more gas than crude before 1965.

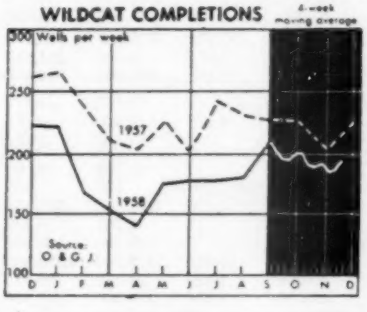
If the producer continues to sell gas energy for about a fifth of the price he would charge for the same amount of energy in the form of crude, the rapid growth in gas production will cut his income for a given amount of energy.

If he dilutes his total energy price below the cost of finding oil and gas, he will soon produce himself out of business.

Here is how gas compares with crude . . .







Active Rotary Rigs*

	12-22-58	12-15-58	12-23-57
Alabama	10	13	9
Arkansas	23	24	23
Arizona	1	1	1
California	89	98	99
Colorado	39	38	39
Florida	....	....	1
Georgia	....	....	....
Illinois	55	50	49
Indiana	9	8	10
Iowa	3	3	2
Kansas	180	174	165
Kentucky	9	8	8
Louisiana	326	335	392
North	37	40	47
S.-Inland Waters	115	140	(‡)
S.-Land	135	113	262
Offshore	39	42	83
Maryland	....	1	1
Michigan	12	13	11
Missouri	1	1	....
Montana	21	27	29
Mississippi	70	66	46
Nebraska	20	22	35
Nevada	....	....	....
New Mexico	101	103	164
New York	1	1	1
North Dakota	36	30	51
Ohio	3	3	1
Oklahoma	263	272	248
Oregon	....	....	....
Pennsylvania	9	9	8
South Dakota	....	....	1
Texas	953	901	1,066
S.-Inland Waters	6	6	(‡)
S.-Land	219	210	244
Offshore	2	2	4
North-East	202	179	(†)
West Central	358	331	(†)
West	166	173	(†)
Utah	38	38	52
Washington	....	....	1
West Virginia	2	1	2
Wyoming	82	81	66
Virginia	....	....	....
Total U. S.	**2,356**	2,321	2,581
Western Canada	208	193	189
Eastern Canada	1	1	2
Grand total	2,565	2,515	2,772

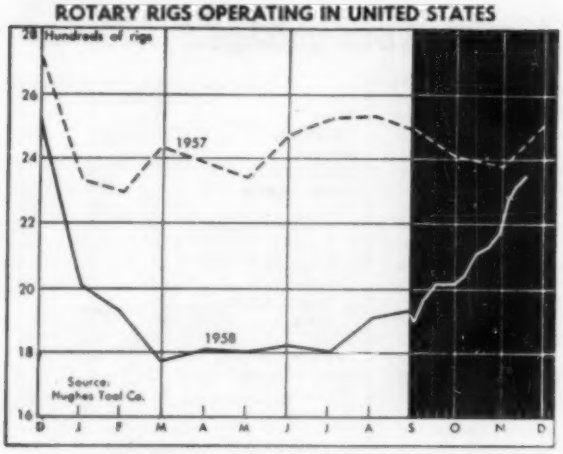
*Hughes Tool Co. †Comparisons not available due to change in method of reporting. ‡Included in South-Land.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 20, 1958

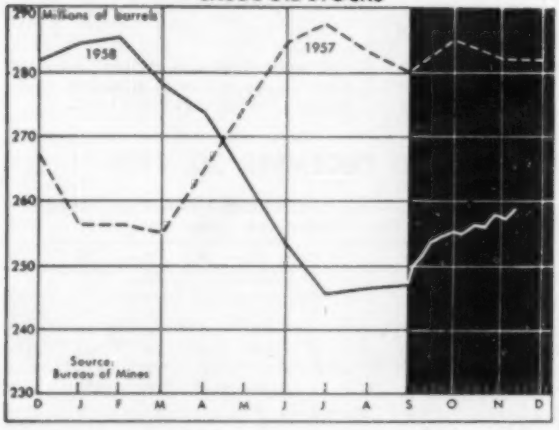
	Total wells							Cumulative		Total wildcats					Cumulative	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1958	1957	Total	Crude	Cond.	Gas	Dry	1958	1957
Alabama	3	1	0	0	2	0	26,676	75	77	2	0	0	0	2	29	28
Arkansas	20	16	0	0	4	0	67,398	809	1,076	3	1	0	0	2	158	204
California	24	15	0	2	7	0	128,201	1,458	2,207	5	0	0	1	4	357	518
Colorado	12	5	1	0	6	0	52,112	818	838	5	1	0	0	4	470	539
Illinois	52	22	0	0	23	7	100,805	2,373	2,643	8	0	0	0	8	439	620
Indiana	17	4	0	0	13	0	28,228	854	718	4	0	0	0	4	303	146
Kansas	79	34	1	4	37	3	273,999	3,921	4,119	15	5	0	1	9	822	807
Kentucky	26	16	0	0	10	0	39,596	1,959	1,448	4	1	0	0	3	175	300
Louisiana	94	39	10	4	41	0	735,439	3,441	3,776	23	1	4	1	17	513	663
North	30	14	0	3	13	0	112,177	1,347	1,408	10	0	0	1	9	230	202
South	52	21	5	0	26	0	496,267	1,682	1,705	10	1	1	0	8	256	371
Offshore	12	4	5	1	2	0	126,995	412	663	3	0	3	0	0	27	90
Michigan	11	7	0	0	4	0	29,759	423	436	4	0	0	0	4	141	149
Mississippi	5	1	0	0	4	0	41,406	390	384	4	0	0	0	4	171	195
Montana	10	2	0	0	8	0	54,708	325	426	4	0	0	0	4	130	181
Nebraska	11	4	0	0	7	0	66,332	710	868	5	2	0	0	3	339	470
New Mexico	31	23	1	3	4	0	151,987	1,884	2,079	4	0	0	0	4	261	263
West	15	10	1	2	2	0	46,911	922	891	2	0	0	0	2	98	100
East	16	13	0	1	2	0	105,076	862	1,188	2	0	0	0	2	163	163
New York	41	20	0	0	0	21	55,473	544	458	0	0	0	0	0	44	11
North Dakota	4	3	0	0	1	0	25,407	438	306	1	0	0	0	1	132	143
Ohio	0	0	0	0	0	0	0	1,008	1,093	0	0	0	0	0	18	18
Oklahoma	168	91	3	11	61	2	554,220	6,210	6,111	20	2	1	3	14	838	730
Pennsylvania	0	0	0	0	0	0	0	573	571	0	0	0	0	0	21	41
Texas	433	212	18	20	159	24	1,820,043	17,629	20,853	83	5	2	1	75	3,526	4,898
Dist. 1	12	3	0	1	8	0	30,676	968	1,218	2	0	0	0	2	359	421
Dist. 2	14	2	2	3	7	0	95,296	713	747	5	0	0	0	5	190	247
Dist. 3	48	20	7	0	18	3	338,844	1,271	1,605	6	1	1	0	4	277	437
Dist. 4	50	8	3	3	20	16	216,901	1,136	1,395	13	0	0	1	12	338	436
East	37	21	3	0	13	0	138,177	1,193	1,329	9	1	0	0	8	323	379
Dist. 7-B	64	29	0	1	34	0	169,367	2,502	2,831	17	0	0	0	17	674	953
West	117	92	3	1	21	0	566,488	5,024	5,903	18	2	1	0	15	682	848
Dist. 9	67	26	0	1	35	5	159,040	3,531	4,448	12	1	0	0	11	564	1,065
Dist. 10	24	11	0	10	3	0	105,254	1,291	1,377	1	0	0	0	1	119	112
Utah	11	6	0	0	5	0	62,941	380	260	4	0	0	0	4	82	122
West Virginia	12	0	0	9	1	2	35,265	756	687	1	0	0	1	0	22	34
Wyoming	19	8	0	1	10	0	111,395	747	845	9	0	0	0	9	258	299
Misc. (Ida., S. D., Fla.)	3	1	0	0	2	0	23,546	94	131	3	1	0	0	2	84	113
Total U. S.	**1,086**	530	34	54	409	59	4,484,936	47,819	52,410	**211**	19	7	8	177	9,333	11,492
Prev. week	1,227	725	17	72	384	29	4,260,491	.....	.....	186	24	2	6	154	.....	.....
Cum. 1958	47,819	23,636	1,093	3,563	18,170	1,357	192,888,600	.....	.....	9,333	898	151	262	8,022	.....	.....
Western Canada	45	31	0	4	9	1	225,778	2,391	2,845	10	2	0	3	5	627	817

PRODUCTION

ROTARY RIGS OPERATING IN UNITED STATES



CRUDE-OIL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	12-13-58	12-6-58	12-14-57
Pennsylvania	2,720	2,761	3,059
Other Appalachian	1,731	1,536	1,765
Illinois, Indiana, Michigan	10,038	10,684	11,101
Nebraska and North Dakota	2,340	2,348	2,795
Kansas	10,233	10,397	10,241
Oklahoma	17,033	17,102	21,042
Arkansas	2,413	2,426	2,887
Louisiana	16,949	16,939	19,451
North	2,971	2,994	2,849
South	13,978	13,945	16,602
Mississippi, Alabama, Florida	2,273	2,423	2,645
New Mexico	8,225	8,408	9,271
Texas	115,728	112,520	124,470
East Texas	8,585	8,356	9,157
West Texas	56,711	54,288	56,982
Texas Gulf	20,499	20,860	24,980
Other Texas	29,933	29,016	33,351
Wyoming	12,961	13,523	13,035
Other Rocky Mountain	9,033	9,175	6,698
California	32,819	33,158	34,507
Foreign	†14,223	13,628	16,243
Total	**258,719**	257,028	279,210

*Bureau of Mines. †Includes 4,831,000 bbl. in California.

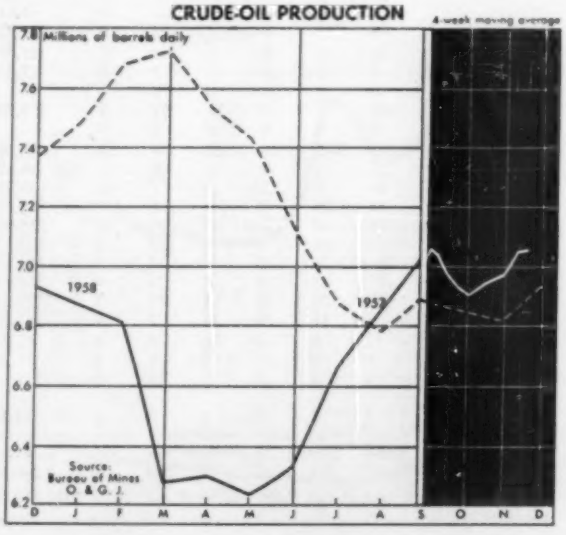
DAILY AVERAGE PRODUCTION FOR WEEK

	December 20, 1958 Crude oil	Lease condensate	Total	Dec. 13 total
Alabama	15,900	.....	15,900	15,800
Arkansas	80,150	150	80,300	80,100
California	855,800	.....	855,800	854,400
Colorado	128,700	.....	128,700	129,500
Eastern	42,900	.....	42,900	43,700
Florida	1,225	.....	1,225	1,225
Illinois	225,100	.....	225,100	227,800
Indiana	33,900	.....	33,900	31,600
Kansas	†323,675	.....	†323,675	†321,750
Kentucky	65,000	.....	65,000	§64,000
Louisiana	829,100	93,925	923,025	922,225
North	110,600	3,825	114,425	113,625
South	718,500	90,100	808,600	808,600
Michigan	25,400	.....	25,400	24,500
Mississippi	114,575	4,875	119,450	119,450
Montana	77,000	.....	77,000	76,900
Nebraska	59,700	.....	59,700	59,900
Nevada	100	.....	100	100
New Mexico	275,500	6,300	281,800	281,800
North Dakota	38,200	.....	38,200	36,500
Oklahoma	540,700	.....	540,700	†548,800
Texas	2,772,000	66,000	2,838,000	2,838,000
Dist. 1	45,000	1,450	46,450	46,450
Dist. 2	122,000	8,000	130,000	130,000
Dist. 3	381,000	33,000	414,000	414,000
Dist. 4	197,000	7,500	204,500	204,500
Dist. 5	31,000	400	31,400	31,400
Dist. 6	121,000	7,300	128,300	128,300
East Texas Field	160,000	.....	160,000	160,000
Dist. 7-B	141,000	100	141,100	141,100
Dist. 7-C	139,000	3,850	142,850	142,850
Dist. 8	1,116,000	2,000	1,118,000	1,118,000
Dist. 9	216,000	1,500	217,500	217,500
Dist. 10	103,000	900	103,900	103,900
Utah	97,600	.....	97,600	98,100
Wyoming	334,000	.....	334,000	335,800
Others	‡75	.....	‡75	‡125
Total United States	6,936,300	171,250	**7,107,550**	§7,112,075
Change from previous week	Down		**4,525**	
Canada	†511,300	.....	†511,300	†433,600

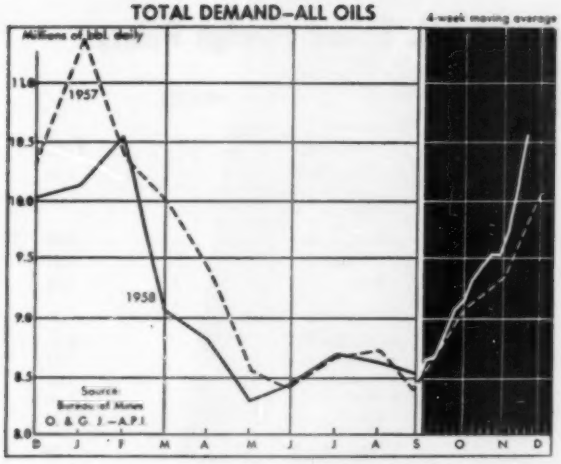
Total U. S. production—Jan. 1-Dec. 20 ..... 2,360,863,250 bbl.
Same period last year (crude plus cond.) ..... *2,542,380,824 bbl.

*Includes 49,912,415 bbl. condensate. †Week ended previous Monday. ‡South Dakota and Washington. §Revised.

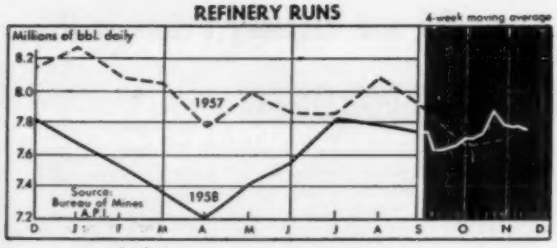
CRUDE-OIL PRODUCTION



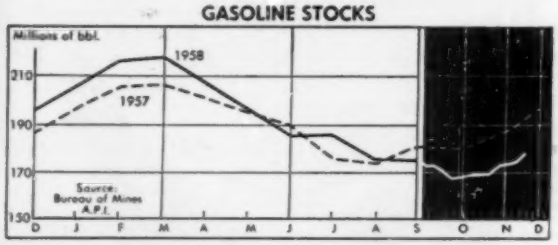
TOTAL DEMAND–ALL OILS



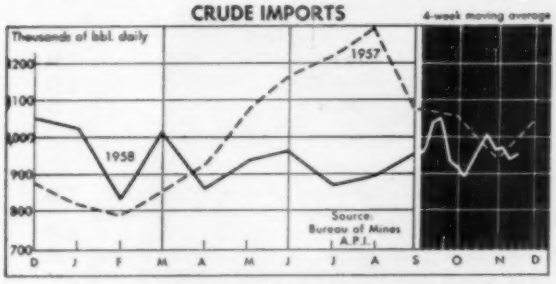
REFINERY RUNS



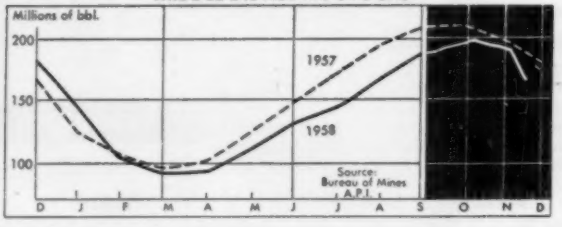
GASOLINE STOCKS



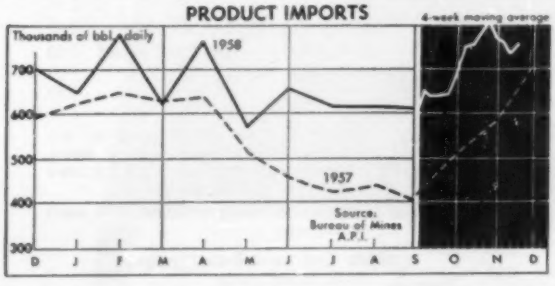
CRUDE IMPORTS



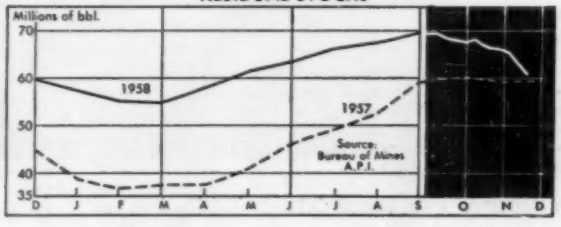
MIDDLE-DISTILLATE STOCKS



PRODUCT IMPORTS



RESIDUAL STOCKS



API REFINERY REPORT, DECEMBER 19, 1958

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, December 1957 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,162	551.4	22.6	392.0	175.6	41,537	10,704	50,395	10,519	1,201	499.9	38.7	349.4	194.5
Appalachian:														
District 1	102	42.7	7.7	21.1	11.9	4,695	458	3,246	310	108	44.6	5.4	24.9	10.8
District 2	102	45.6	5.1	17.9	16.7	2,409	457	1,298	160	105	55.2	7.7	18.6	16.8
Ind., Ill., Ky.	1,441	728.3	62.6	344.0	189.6	30,318	6,373	24,405	4,372	1,439	734.1	83.1	326.7	218.4
Minn., Wis., Dak.	111	52.3	4.9	27.6	12.4	6,993	1,227	6,937	546	105	52.3	6.0	25.2	11.6
Okla., Kans., Mo.	746	415.1	15.8	187.6	32.7	16,445	1,508	11,630	967	731	415.2	12.6	202.7	38.6
Inland Texas	295	204.9	5.0	48.8	25.1	6,992	371	2,311	2,192	266	207.2	9.9	49.6	23.3
Tex. Gulf Coast	1,779	952.0	130.0	524.7	181.4	24,493	3,135	13,752	6,047	1,807	906.2	124.9	489.3	213.4
La. Gulf Coast	640	358.2	82.7	142.7	49.9	11,175	1,887	6,334	1,592	599	351.3	51.2	149.7	42.7
N. La. and Ark.	91	47.7	3.7	23.6	7.6	4,234	1,154	1,980	116	95	38.9	7.5	20.3	8.0
Rocky Mtn.:														
New Mexico	27	16.0	.....	3.9	2.4	513	25	130	47	24	11.9	0.3	4.5	3.0
Other	257	118.6	3.7	63.1	23.4	4,909	268	2,813	843	256	126.6	4.0	63.1	36.2
West Coast	1,069	518.1	6.9	184.7	350.3	23,886	369	12,951	32,957	1,080	512.4	4.9	161.6	324.6
Dec. 19, 1958	7,822	4,050.9	350.7	1,981.7	1,079.0	178,599	27,936	138,182	60,668	7,816	3,955.8	356.2	1,885.6	1,141.9
Dec. 12, 1958	7,788	4,034.3	385.4	1,950.1	1,001.6	174,706	29,647	148,087	62,816	.....	.....	.....	.....	.....
Dec. 20, 1957	7,712	3,894.9	348.0	1,872.3	1,083.0	189,486	27,719	152,383	57,674	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

Crude-Oil and Refinery Prices at Representative U. S. and Foreign Points

REFINED-PRODUCT PRICES

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):	
Regular (89 octane)	11.50-11.625
Premium (99 octane)	14.50-14.625
Gulf Coast (cargoes for coastwise or export movements):	
Regular (90 octane)	10.25
Regular (92 octane)	10.50
Premium (97 octane)	11.625
Premium (98 octane)	11.75
California (rack) (Los Angeles):	
Regular (88 octane)	12.25
Premium (94 octane)	13.25
Premium (98 octane)	14.25
Caribbean area (cargoes):	
Regular (87 octane)	9.875
Premium (97 octane)	11.625

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

NATURAL GASOLINE*

Group 3:	
Grade 26-70	4.5
Breckenridge:	
Grade 26-70	4.0

*If 26-70 natural is considered as 100%, prices for lower-vapor-pressure grades increase 2.5% for each unit drop in Reid vapor pressure down to and including 16 lb. Prices for grades below 16 lb. may vary slightly by areas or plants.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):	
★ Kerosine 42-44	10.25-10.50
★ Diesel oil (58 d.i. and above)	10.00-10.25
★ Distillate No. 1	10.00-10.25
★ Distillate No. 2	9.25-9.50
Gulf Coast (cargoes):	
Kerosine 41-43	9.625
Distillate No. 2	9.125
New York Harbor (barges):	
Kerosine 41-43	11.00
Distillate No. 2	10.50
Diesel fuel, 48-52 d.i.	10.75
Caribbean area (cargoes):	
★ Distillate No. 2	9.125

WAX (LB.)

Oklahoma (Group 3):	
132-135 A.m.p. (semi-refined) in tank car	6.50
New York (export):	
126-130 A.m.p. crude-scale (solid in bags or barrels)	7.35

★Denotes change from previous week.

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
★ Residual fuel (max. 1% S)	$1.60-1.80
Gulf Coast (cargoes):	
Bunker C fuel	$2.00
New York Harbor (barges):	
Bunker C fuel	$2.37
Caribbean (cargoes):	
Bunker C	$2.00
California (rack):	
Bunker C fuel, Los Angeles	$2.15

LUBRICATING OILS

Mid-Continent (Group 3):	
150-160 bright stock, solvent refined, 0-10 pp., 95 v.i.	23.0
200 vis. neutral oil, solvent refined, 0-10 pp., 95 v.i.	20.5
Pennsylvania Grade:	
145-155 vis. at 210, bright stock, 8 color, 25 p.t.	22
200 vis. neutral (180° at 100°), 25 p.t.	21

CRUDE-OIL PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.	Okla-homa*	Gulf Coast Tex.†	West Tex.‡ N.M.	Wyo. (sour)
14-14.9	$1.86	....	....	....	....
15-15.9	1.95	....	....	....	$1.81
16-16.9	2.04	....	....	....	1.86
17-17.9	2.13	....	....	....	1.91
18-18.9	2.23	....	....	....	1.96
19-19.9	2.32	....	....	....	2.01
20-20.9	2.41	$2.52	....	$2.62	2.06
21-21.9	2.50	2.55	....	2.64	2.11
22-22.9	2.60	2.58	....	2.66	2.16
23-23.9	2.69	2.61	$3.44	2.68	2.21
24-24.9	2.78	2.64	3.46	2.70	2.26
25-25.9	2.87	2.67	3.48	2.72	2.31
26-26.9	2.96	2.70	3.50	2.74	2.36
27-27.9	3.06	2.73	3.52	2.76	2.49
28-28.9	3.11	2.76	3.54	2.78	2.54
29-29.9	3.16	2.79	3.56	2.80	2.59
30-30.9	3.22	2.82	....	2.82	2.63
31-31.9	3.27	2.85	....	2.84	2.67
32-32.9	3.33	2.88	....	2.86	2.71
33-33.9	3.38	2.91	....	2.88	2.75
34-34.9	3.44	2.94	....	2.90	2.79
35-35.9	3.49	2.97	....	2.92	2.83
36-36.9	3.55	3.00	....	2.94	2.87
37-37.9	3.60	3.02	....	2.96	2.89
38-38.9	....	3.04	....	2.98	2.91
39-39.9	....	3.06	....	3.00	2.93
40-44.9	....	3.08	....	3.02	2.95

*Top prices on other Oklahoma (sweet) postings vary from $3.15 to $3.01 a barrel. †Low cold test crude. ‡Sour.

Effective dates of broad changes: California, 9-30-58: East of California, January 3-10, 1957; Pennsylvania Grade, 6-18-58.

FLAT PRICES

Louisiana:	
Sweet Lake	$3.00
Ville Platte	3.30
Texas:	
East Texas	3.25
Conroe	3.53
Van	3.08
Pennsylvania Grade:	
★ Bradford	4.05
★ Middle District	3.87
★ Southwest Pennsylvania	3.58
★ West Virginia	3.40
Buckeye Grade	3.25
Illinois Basin	3.00
Canada:	
Leduc-Woodbend	2.67
Redwater (Alta.)	2.58
Smiley (Sask.)	2.33
Pembina	2.52

FOREIGN

Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.66
San Joaquin, 41°-41.9°, Puerto La Cruz	3.25
Oficina, 35°-35.9°, Puerto La Cruz	3.05
Tia Juana medium, 26°-26.9°, Amuay*	2.55
Quiriquire, 16.0°-16.4°, Caripito	2.15
Lagunillas heavy, flat, Las Piedras*	2.10
Bachequero, flat, 15°-16°, Las Piedras*	1.93

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes, f.o.b. lifting port):	
Arabian, 36.0°-36.9°, Ras Tanura	$2.12
Iranian, 34.0°-34.9°, Bandar Masur	2.04
Iranian, 34.0°-34.9°, Ababan	1.99
Iraq, 35.0°-35.9°, Fao	1.98
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.85
Qatar, 41.0°-41.9°, Umm Said	2.25
Middle East, E. Mediterranean:	
Arabian, 36.0°-36.9°, Sidon	2.49
Iraq, 36.0°-36.9°, Tripoli, Banias	2.49
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.75

TANKER RATES PER LONG TON

(Latest reported spot fixtures)

★ Gulf-U.S.N.H., clean (USMC +15%)	$3.28
★ Gulf-U.S.N.H., dirty (USMC —10%)	2.57
★ Carib.-U.S.N.H., clean (USMC —40%)	1.62
★ Carib.-U.S.N.H., dirty (ATRS —40%)	1.65

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BOX K-993, THE OIL AND GAS JOURNAL,
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Box K-994,
The Oil and Gas Journal,
Tulsa, Oklahoma.

LEGAL

SEALED BIDS will be received until 2:00 P. M. CST January 15, 1959, and opened at that time in the Office of the Fort Berthold Indian Agency, New Town, North Dakota, for the leasing of 8723.84 acres of allotted Indian land located in McKenzie, Dunn and Mercer Counties, North Dakota, for oil and gas mining purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of the Fort Berthold Indian Agency at New Town, North Dakota or call MA 7-4340.

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SEALED BIDS will be received until 10:00 A.M. Mountain Standard Time, January 13, 1959, and opened at that time in the office of the Navajo Indian Agency, Window Rock, Arizona, for oil and gas leases, on 45 tracts of tribal lands, totaling approximately 102,690.32 acres, located in San Juan County, New Mexico. Detail: of the lease offering and filing of bids may be obtained by addressing an inquiry to the General Superintendent, Navajo Indian Agency, Attention: Branch of Realty, Window Rock, Arizona.

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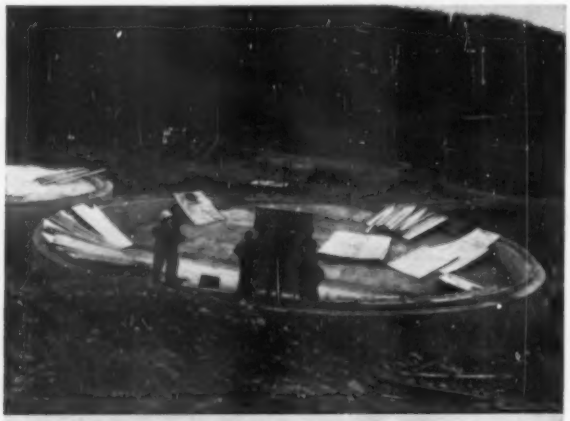

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5. The bolted joints are water tight and air tight.
6. The tanks are designed to be quickly and easily dismantled, shipped to a new construction site and re-erected.

At the same site, this customer is using several smaller National Bolted Steel Storage Tanks to store fuel oil and gasoline.

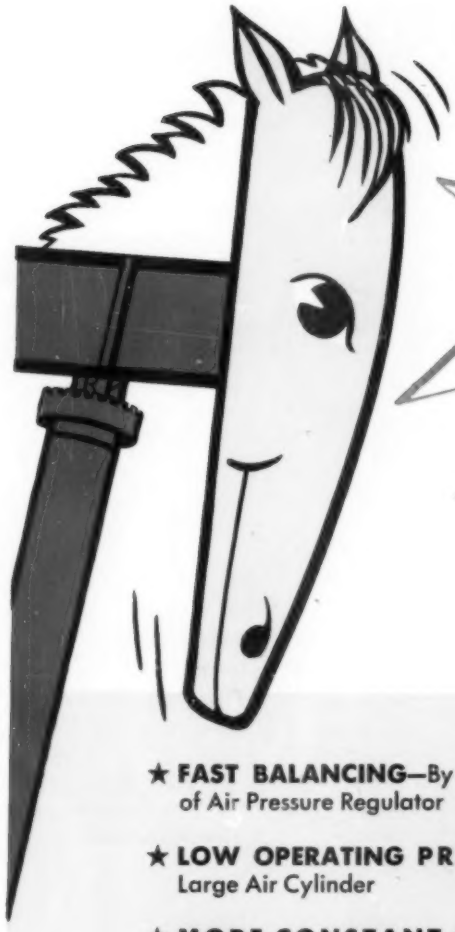
National Bolted Steel Tanks are used for storage of oil, water, grain, feed, sand, drilling mud, gravel and many other bulk materials.

Let National's Experience Help You Solve Your Storage Problems

It's a National®

NATIONAL TANK COMPANY

TULSA, OKLAHOMA



QUICK BALANCING

THRU PRESSURE REGULATION ON CABOT AIR BALANCED PUMPING UNITS!

★ **FAST BALANCING**—By Adjustment of Air Pressure Regulator

★ **LOW OPERATING PRESSURE**—Large Air Cylinder

★ **MORE CONSTANT COUNTER-BALANCE**—Giant Air Reservoir

★ **EASY STARTING**—Cut-off Valve Retains System Air During Shut Down

★ **REDUCED WEIGHT**—No Cast Iron Counterbalance

★ **REDUCED FOUNDATION COST**—Compact Design

★ **CLAMP TYPE HOLD-DOWN**—Easy to Install and Align

★ **PORTABLE BASE**—Optional Wide Base Unit for Test Wells

It's Easier to Handle Air than Iron Weights

SEE YOUR J & L SUPPLY MAN or write Cabot for details

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CABOT INC.

PAMPA, TEXAS

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